Cambridge Water

South Staffs Water

South Staffordshire Water PLC

Looking to the future

Long-term delivery strategy 2025 to 2050

About South Staffordshire Water

We operate South Staffs Water and Cambridge Water

We are part of the South Staffordshire Plc group of companies

We are a water only company, and do not take away and treat waste water

We are regulated by Ofwat, the Environment Agency and the Drinking Water Inspectorate

We provide clean water to more than 1.7 million people and 42,500 businesses every day

We have been a successful, privately-run business for 170 years. We have never been in public ownership

Our vision, mission and purpose

Our vision

To deliver clean, affordable water every day

Our mission

To make sure:

- all our customers have access to high-quality and affordable drinking water every day; and
- we always empower our people to provide an excellent and trusted service.

Our purpose

Over the past 170 years, we have provided high-quality water supplies to customers in our Cambridge and South Staffs regions. So that we can keep providing this essential public service, we:

- put customers' needs at the heart of all our decision making;
- actively work in partnership with local communities;
- act as the guardians of our assets, building resilience with regular investment;
- work hard to protect and enhance the natural environment; and
- run an efficient business, in everyone's interests.

This is how we are **securing the water future – for our customers, our communities, the environment and our people**.

Our values

Our mission and purpose are underpinned by our values.

- Equality, diversity and inclusion
- Excellence in service
- Responsibility
- Trust and respect

These values are reflected in our people's objectives and the work they do.

Structure of this long-term delivery strategy

While this strategy is primarily aimed at our regulator Ofwat, we recognise that many people will have an interest in it. This includes our customers and other stakeholders, our people and our investors. So, we have structured this document in a way that follows Ofwat's guidance, that is easy to navigate and that will be meaningful to all readers.

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Part 1: Setting the context for our strategy

A joint welcome from our Chair and Managing Director

Welcome to South Staffordshire Water's delivery strategy for the 25 years from 2025 to 2050, which sets out our long-term vision for the services we will deliver for our customers, our communities and the environment. It considers the measures we have explored to ensure our customers always receive from us high-quality water and a seamless experience at an affordable price.

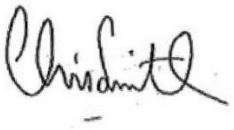
We pride ourselves on being an ambitious, efficient and high performing business. We regularly keep pace with the larger water and sewerage companies in the England and Wales water sector; indeed, in some areas of performance we are showing leadership and driving the other companies forward. We welcome that our regulator Ofwat is taking a long-term view of the services customers want and the environmental enhancements required – and the associated investment needed to deliver all this.

As the provider of clean water supplies across our geographically and socially diverse Cambridge and South Staffs regions over the past 170 years, we've always taken a long-term view of business planning. As well as providing security to our customers and other stakeholders, we think this approach provides security to our shareholders, who are supportive of our planning and decision-making – and who are themselves committed to taking a long-term view of their investment in our business.

But we're facing a number of significant challenges that mean the future is looking much more uncertain. A changing climate, population growth, changing customer expectations and the current cost of living crisis all mean we need to be able to adapt quickly and flexibly to changing circumstances. So, to enable us to deliver our long-term vision, within this strategy we've developed five key ambitions: for the services we deliver; to preserve and enhance the environment; for our customers and communities; and for our business.

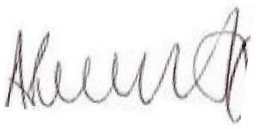
This gives us a framework that will enable us to focus on the things that matter most to our customers and demonstrate our value to society as the provider of an essential public service. It will also ensure that any investment we make over the next 25 years is robust to challenge, and yet flexible enough to adapt to a changing future. In this document, we describe how we're planning to deliver each of these ambitions – and, in turn, how this will help us to secure a sustainable, long-term water future for our Cambridge and South Staffs regions.

We're confident that it will enable us to overcome the challenges we face, and believe it will have a positive impact on our customers, communities and the environment, now and in the future. We pride ourselves on developing a strategy for the future that is pragmatic, well thought out, data driven and affordable.



Lord Smith of Finsbury

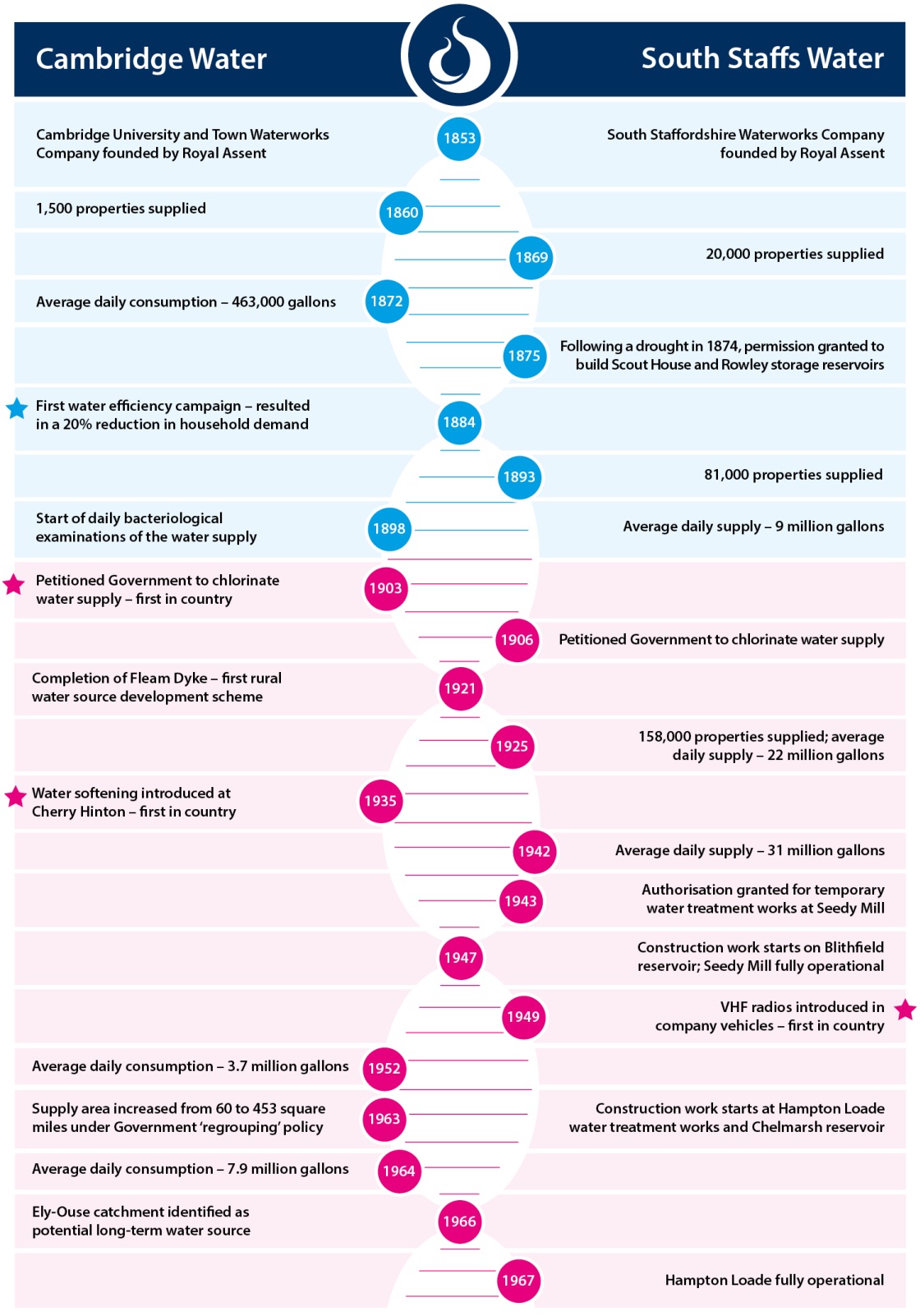
As the custodians of this strategy, we'll keep it under review, adapting and flexing our planning and decision-making in line with changing circumstances. In this way, we'll always be able to deliver the things that matter most to our customers and achieve our vision of delivering clean, affordable water services every day.

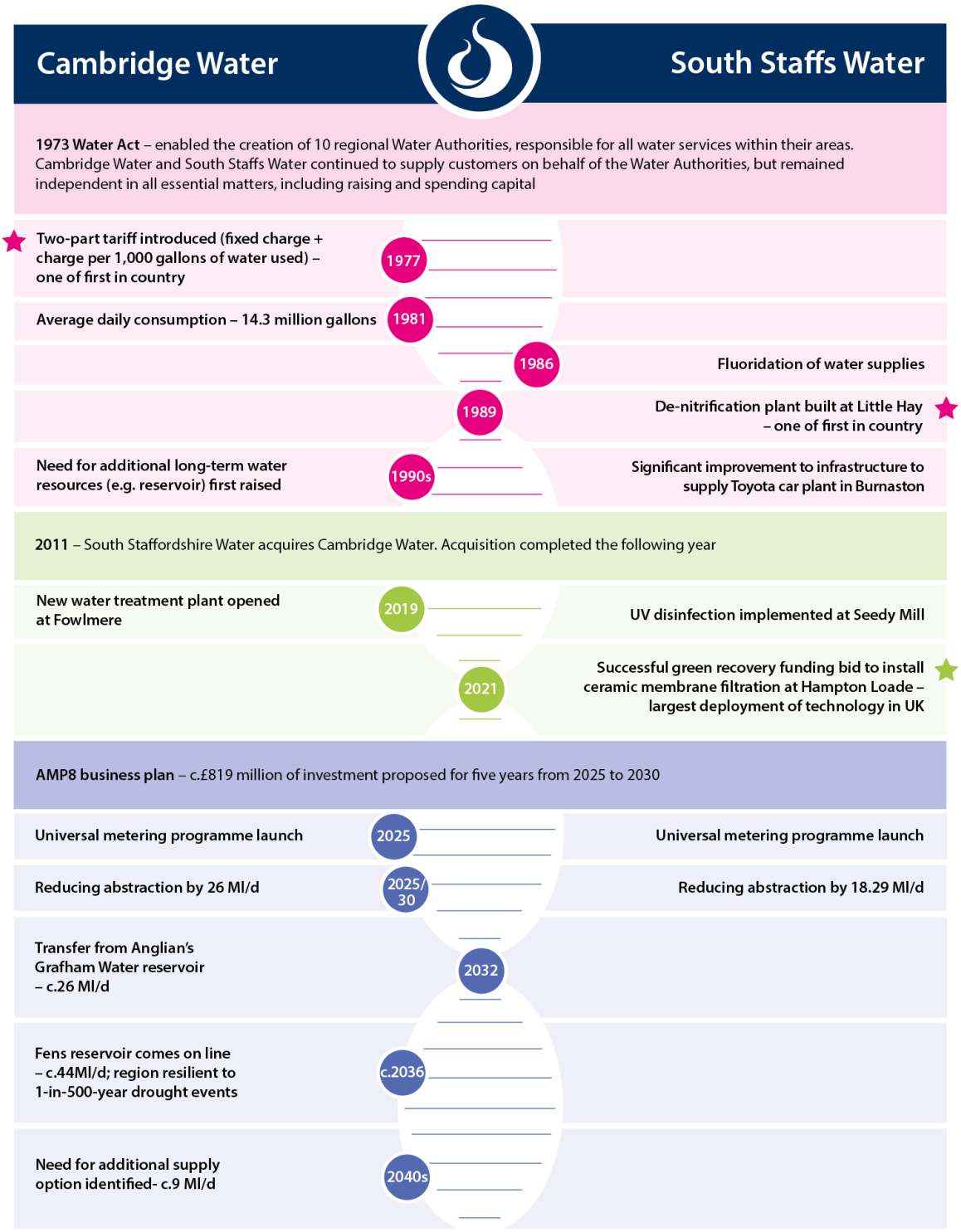


Andy Willicott

Long-term planning in action – a timeline

Long-term planning is in our DNA. We have provided an essential service to customers across our Cambridge and South Staffs regions since 1853, when we were founded in the interests of public welfare to supply clean water.

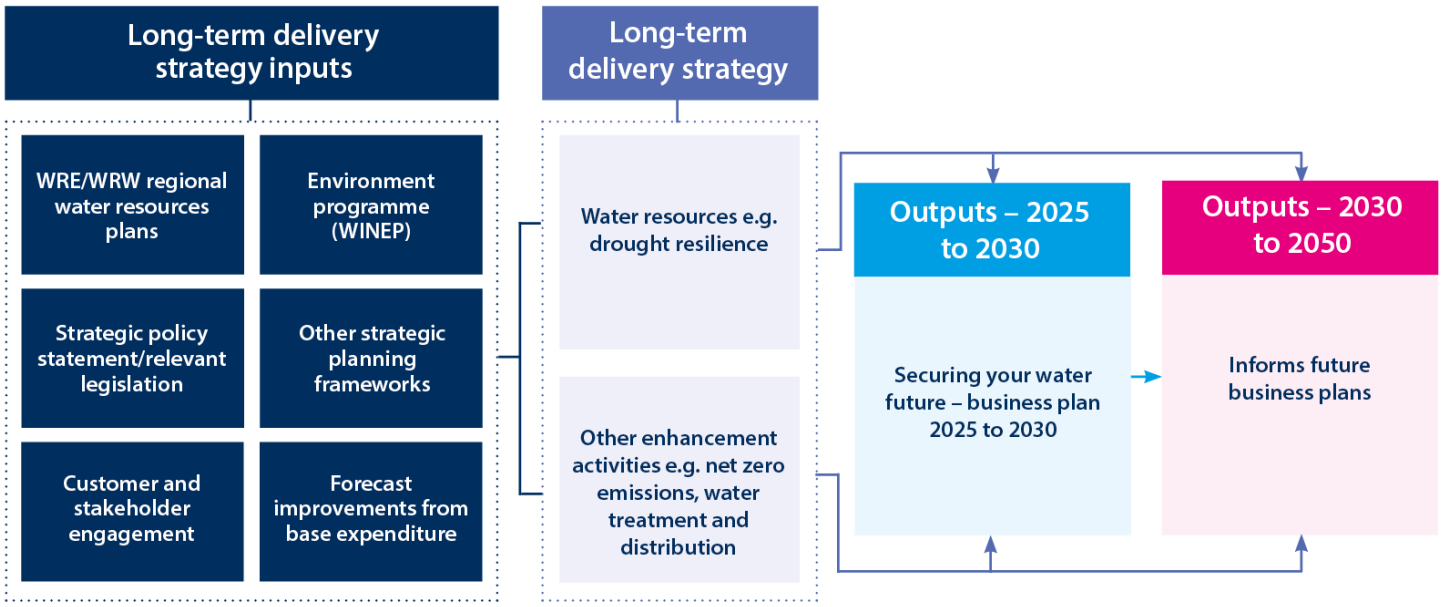




Note: Ml/d = megalitres per day. A megalitre is one million litres.

How our long-term delivery strategy aligns with other plans

Our long term ambition documented in this plan sits along side, and is complimentary to, a number of other plans and strategies, such as our PR24 business plan, our Water Resource Management Plans, regional plans and customer engagement programmes, as summarised below.



Executive summary

Our regulator Ofwat has put long-term planning at the heart of its current periodic review of water companies' price controls (PR24). Along with the other regulated water companies in the sector, we have been asked to think about the five-yearly price reviews as staging posts in an overall journey towards delivering more long term outcomes for customers and the environment.

This means we have to think carefully about how we organise, plan and deliver our activities – and the promises we make to our customers and stakeholders – over a 25-year time frame. It also means thinking about how we do this in a way that reflects our customers' priorities and represents the best value for them. And it means having plans that are adaptable and that can flex quickly to changing circumstances.

We believe that adopting a long-term strategy for delivering the best outcomes for customers will enable us to better align our existing frameworks for:

- business planning;
- water resources management planning; and
- regional water resources planning.

It will also help us to play our part in delivering wider societal and environmental outcomes. In particular those that are reflected in our trade body Water UK's Public Interest Commitment and the legally-binding targets set out in the Environment Act 2021.

Looking to the future – playing our part to deliver wider societal and environmental outcomes

As the provider of an essential public service, we have an important part to play in delivering the things that are important to our customers, while also making sure we protect and enhance the environment that we all rely on and enjoy. This includes delivering a number of key water sector-wide and government targets as set out in Water UK's Public Interest Commitment and the Environment Act 2021.

Water UK's Public Interest Commitment

In 2019 Water UK, the body that represents water companies, published its Public Interest Commitment. The aim was to reinforce the social contract that is implicit between the water companies, as the providers of an essential service, and their customers. Key to this is the commitment from all UK water companies to work together and with others towards achieving the following challenging goals.

- **Triple the rate of sector-wide leakage reduction by 2030**, as part of a wider long-term strategy to reduce household water use and invest in more water transfers and water storage.
- **Make bills affordable as a minimum for all households** with water and sewerage bills no more than 5% of their disposable income by 2030 and develop a strategy to end water poverty, adopting approaches tailored to local needs as appropriate.
- **Achieve net zero carbon emissions for the sector by 2030**, working with the supply chain and others to help tackle the causes of climate change.
- **Prevent the equivalent of four billion plastic bottles ending up as waste by 2030**, including ending the use of avoidable single-use plastic across our business and supporting societal contributions through education and making water refill facilities available.
- **Be the first sector to achieve 100% commitment to the Social Mobility Pledge**, promoting opportunities in local communities and increasing talent and diversity within individual water companies.

Environment Act 2021

The Act aims to improve the natural environment. It provides a legal framework for environmental governance following the UK's exit from the European Union and has introduced targets to improve the environment in relation to air quality, biodiversity, conservation and water, among other things. With specific reference to the water sector, the Act includes targets to:

- reduce leakage by 50% by 2050 from 2017/18 levels;
- reduce household water use (per capita consumption, or 'PCC') to 122 litres per person per day (l/p/d) by 2038 and by 110 l/p/d by 2050 (figures are based on WRMP dry year annual average);
- reduce non-household water consumption by 9% by 2038 and 15% by 2050;
- reduce distribution input (DI) per capita by 20% by 2038; and
- achieve net zero embedded carbon emissions by 2050.

These targets are reflected in the latest 25-year water resources management plans (WRMPs) for our Cambridge and South Staffs regions covering the period from 2025 to 2050.

In developing this strategy, we have engaged extensively with our customers and stakeholders and have taken their views into account.

Our long-term ambition – where we will be in 2050

As the provider of an essential public service for 170 years, we have always taken a long-term approach to business planning. This includes taking account of customers' changing expectations and priorities over time, making sure we always anticipate these efficiently and effectively. To ensure we always demonstrate our value to our customers and society, we are focusing our attention for the long term on a number of key priorities.

These are to:

- eradicate water poverty;
- protect and enhance the natural environment;
- adapt to a changing climate;
- meet the needs of a growing population; and
- remain financeable as a business over the long term.

We have developed the following ambition statements, which set the context for our vision to 2050.

- Our service. We will use cutting edge technology and ensure the infrastructure is in place so that customers always receive resilient, high-quality water supplies.
- Our environment. We will lead in protecting and enhancing the environment – working with partners to ensure sustainable water supplies and flourishing local habitats.
- Our customers. We will innovate to exceed customers' expectations of our service, end water poverty and make sure help is always available.
- Our communities. We will use partnerships and education to lift our communities, creating space and opportunities to help people work and thrive.
- Our business. We will lead in adapting to climate change and will run a safe, efficient and sustainable business, with a highly-skilled workforce.

These ambition statements have been shaped by our people and the Board. For each ambition statement, we have set a number of long-term goals, stretching ourselves to think outside the box and deliver meaningful long-term change.

Why this strategy is the best one for us

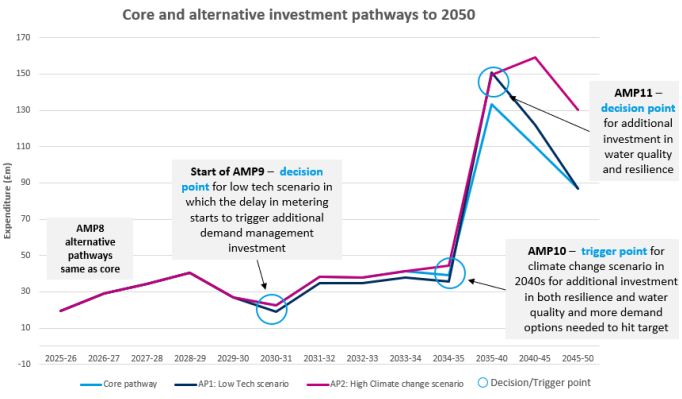
Our Long-term delivery strategy (LTDS) delivers our ambitions and targets by taking a holistic and adaptive approach in developing our plans across all our key investment areas to form our adaptable core and alternative pathways that meet our customers' expectations of the services they want us to deliver, at the right time.

Our strategy incorporates outputs from key strategic planning frameworks, customers priorities and preferences, intergenerational fairness, best value and no/low regret options that meet a range of plausible scenarios developed through various data driven tools, models and decision frameworks to determine key activities required up to 2050.

Our LTDS sets out our strategy, and our PR24 business plan is an integral and essential foundation for that journey. Thus our strategy has a clear line of sight from our AMP8 no/low regret investment proposals developed and set in the context of achieving our long-term outcomes.

How we will achieve our long-term ambition

Our core investment pathway was tested against all the Ofwat common reference scenarios and where needed, was adapted to produce alternative pathway of activities to ensure we meet our long-term outcomes and ambitions. The assessment identified certain decision and trigger points where additional investment was required under two scenarios – the high climate change scenario and the low technology scenario as illustrated below:



Our assessment has also helped us to develop a monitoring plan which allows us to objectively assess which of the potential futures will be realised and monitor key activities or metrics that will indicate when we have reached a 'tipping point' that means we need to adapt our plan and invest in the right investment options at the right time.

We have also looked at a wider affordability scenario recognising the changing nature of affordability and our local

challenges. An alternative plan was not deemed appropriate at this time given the uncertainty of the impact of Fens reservoir on bills, so we have proposed instead to monitor and track the levels of water poverty in our supply area as a key metric to enable us to adapt our affordability strategy to ensure we deliver our ambition of eradicating water poverty and that our customers water bills are affordable, both now and in the future.

The assumptions and foundations that underpin our strategy

We recognise long term adaptive plans will undoubtedly carry a high level of uncertainty with time and thus have stated clear assumptions of what we understand today and what may change over time as new information and evidence becomes available. Our assumptions include improvements in base expenditure to current regulatory drivers and standards. As per guidance we have not pre-empted new regulatory drivers but recognise the need to ensure we have a strategy that is adaptable to future uncertainties.

A key aspect to managing uncertainty will be a continuous monitoring of key activities and their relationships to triggers and/or decision points. These will be tracked against a metric or key activities that inform decision points and investment required. That way, timely and cost-efficient decisions can be made as we refresh and adapt our plan. These key activities are captured in our monitoring plan.

Recognising the uncertainty the future brings, we have therefore been able to assess some of the elements of the LTDS when considering the longer term through data driven tools or extending models (e.g. resilience, interconnectors, raw water quality and supply and demand schemes from WRMP). However, for other areas of the LTDS where data was very limited and where there is a high level of uncertainty which we cannot meaningfully alleviate through alternative pathways or wider scenarios, it required us to make expert judgement supported by key activities to appropriately account for the uncertainty. These activities include key areas we need to monitor to enable us to understand the future investment requirement. An example of this is the need to investigate the level of abstraction reduction requirements in AMP8 through WINEP to inform the long-term requirements that will make a difference as part of our environmental destination journey.

The foundation to our strategy will be following these key attributes to help deliver our long-term ambition:

- Our people. We will need to make sure that our people have the skills needed to deliver our long-term ambitions. We are committed to running an efficient, sustainable business where our people are empowered to make decisions and where they possess the skills necessary to realise our long-term goals. Each member of our team, whether in the field, our offices or our contact centre, plays a crucial role in bringing our long-term plan to life. Their dedication and hard work are integral to securing a sustainable water future for all of us

- Partnership working. Looking ahead, we want to be a sustainable business that always delivers value for money for our customers – and long-term value for society and the environment. Key to this is working in partnership with a range of stakeholders and communities to make sure we generate positive impacts for local communities and ensure we leave the environment in a better state for future generations.

- Collaboration and open data. Fostering a culture of collaboration both internally and externally will play a key part in achieving our long-term outcomes. Open data and collaboration across different teams and functions and the wider sector will untap cost efficiencies and ample opportunities. We are currently part of a number of collaborative industry working groups such as SPRING, Water efficiency strategy steering group and UKWIR research and this work will continue.

- Innovation. innovation is key to achieving our long-term stretching targets. Will do this by testing and discovering new solutions to sourcing funds from innovation competitions and other third parties. This will require a strong culture of innovation within our everyday business-as-usual activities. This will be essential for delivering the improvements our customers expect and are willing to pay for and to 'exceed expectations' as per our ambition for customers.

Engaging with our customers and stakeholders

Customers will always be at heart of our plans. Key to this remains the need for us to understand fully our customers' and stakeholders' needs and priorities, and for this to be embedded in our planning and decision making informing our LTDS ambition and strategy.

We have undertaken extensive wide-ranging research on customers' priorities and preferences over the long term. We have used various engagement techniques, including in-depth stakeholder interviews, and deliberative qualitative and quantitative customer research to draw out customer priorities insights on our ambitions and the pace of delivering them. Following the completion of our LTDS research, we then worked with our PR24 research and triangulation partners, Impact Research, to develop a decision-making framework to evidence that our LTDS ambition and strategy reflects our customers' priorities.

Our main conclusion from our intergenerational fairness research studies is that we have a consistent majority customer preference for an even, natural bill profile up to 2050 and that important investments that provide a solution to the long-term challenges we face should not be delayed.

Engaging with customers and stakeholders

Customer engagement

We have carried out a robust end-to-end journey of engagement to inform this strategy, learning and adapting through each stage of the research.

Focusing on customer preferences for our long-term ambitions

Building on our early engagement with our customers around our vision to 2050 and long-term bill profiles, we started the process of planning for our in-depth LTDS customer engagement in October 2022. This started with a wide-ranging review of all the Ofwat and wider guidance related to ensuring robust LTDS plans are developed. This included reviewing the following insights already collected between 2020 and 2023, where we carried out wide-ranging desk research and a deliberative research programme, supported by robust quantitative studies. This includes, but is not limited to:

- A wide-ranging research programme to inform the water resources management plans for our Cambridge and South Staffs regions, carried out at a local/regional level;
- Ongoing conversations with the H2Online communities in our Cambridge and South Staffs regions about our long-term vision and customer priorities;
- Customer valuations research studies, both our local level study and the collaborative ODI study, led by Ofwat; and
- Our customer priorities tracker, specifically the qualitative focus groups, exploring long-term priorities to 2050, including intergenerational fairness over bill profiles.

Building on our **"eight guiding principles"** which have been used to ensure all our research studies are "high-quality" we specifically focused our LTDS engagement on the following principles:

- Outputs must show a clear line of sight between customer preferences and this strategy.
- Engagement must be meaningful to customers and inform high-level strategic decisions.
- Engagement should not overly duplicate areas of previous engagement.
- The engagement approach that meets Ofwat's standards for high-quality research.

We have engaged on the following aspects of this strategy.

- **Ambition:** where we are considering going above statutory requirements, we asked for customers' preferences on our level of ambition. This includes supply interruptions, removing water quality risks (e.g. lead and chemicals), environmental improvements, Green House Gas (GHG) emission and tackling water poverty.
- **Strategy:** we asked customers about the pace and sequencing of key investment choices in our core pathway. We also asked customers to consider trade-offs between best value/least cost options, intergenerational fairness and affordability.

We drafted a comprehensive research brief to enable our research partners to submit proposals to carry out a research study to meets our main objectives:

- Understanding how customers and future customers wanted strategic long-term investments to be phased to deliver benefits and the preferred balance between current customers funding the investments needed versus future customers – known as intergenerational fairness.
- Understanding how we should ensure that our services are affordable for all, now and in the longer term, and how we can improve their delivery of public value. Additionally exploring customer preferences on how SSC could innovate to increase productivity, reduce costs, and improve resilience, service, and the environment, taking advantage of technological change;
- To "stress test" key decisions related to customer choices on whether, and when, they want us to spend additional money to go beyond the statutory minimum level of services that the company legally must deliver. The strategic decisions that are likely to be relevant involve trade-offs such as affordable bills to fund core service vs delivering environmental and social value;
- Given these objectives there were several linked areas to explore, such as the pace of the journey to net-zero carbon and removing water quality risks from the public water supply, the speed of tackling water poverty, reducing supply interruptions,

abstraction reduction, and demand management. Additionally, the research looked at how far, and when, we should go beyond statutory requirements for restoring the environment.

- Between January and June 2023 we worked with our research partner, Turquoise Thinking, who carried out robust qualitative and quantitative research, focusing on ten key ambition areas. This includes, but is not limited to:
  - feedback from key stakeholders on the proposed research approach to challenge and inform that approach;
  - collecting participants' spontaneous perceptions on water ahead of workshops and the priority ranking of ambitions;
  - eight reconvened qualitative workshops covering a range of customer segments (household, non-household, future);
  - testing of the quantitative questionnaire ad stimulus comprehension; and
  - quantifying the findings from the reconvened workshops with a robust representative sample.

Table 1: Summary of the main stages of our LTDS research study

Research Stage	Description	Benefits
Four Stakeholder depth interviews - including CCW, ICG Chair, SSC Independent Non-Executive Director and water sector expert at PA Consulting	Feedback from key stakeholders on the proposed research approach	Expert views to challenge and inform the research programme to ensure best outcomes
Pre-workshop homework task	Collecting participants' spontaneous perceptions on water ahead of workshops	Engage respondents with the subject matter and provide a benchmark to assess how the informed views change perceptions in the online workshop discussion
Reconvened online workshops	Qualitative workshops covering a range of customer segments - HH, NHH and future customers, 52 participants	Education of participants and core qualitative discussion around SSC's challenges and long-term ambitions, targets and priorities.
Post-workshop homework tasks	Collecting participants' priority ranking of ambitions after both workshop 1 and workshop 2	Collection of participants' views long-term ambitions, targets and priorities allowing tracking of changes throughout the research.
Cognitive testing depth interviews	Testing of the quantitative questionnaire and stimulus comprehension – 10 customers	Ensuring that the question set and stimulus material had the best possible balance between giving participants the required information to give a meaningful response, while ensuring it was understandable for all groups
Quantitative survey	Online, and face-to-face, survey with HH customers, NHH customers and future customers, 1,080 participants	Quantification of the qualitative findings with a robust and regionally representative demographic sample of customers and future customers

Key finding from our LTDS research study

The main findings from our LTDS study are summarised below. Please refer to the full LTDS research report can found on our website showing detailed findings for each ambition area.

Participants in both the qualitative workshops and follow-up quantitative survey were largely supportive of the ambitions put forward in the study. In the workshops, there were three key ambitions that participants want to see tackled as the highest priority: lead pipe removal, leakage reduction and improving water quality. These findings were largely supported in the quantitative survey, with these three ambitions ranked in the top four priorities for HH customers. The other ambition, which was viewed as a top-3 priority in the quantitative survey, was tackling water poverty.

There was also agreement across the project in terms of the two lower ranked priority ambitions. Participants, overall, in both the workshops and the quantitative survey ranked pro-active customer service and achieving carbon net zero carbon as lower priority ambitions. However, it is important to note that most customers wanted all the 10 ambitions delivered.

Water quality is a priority, because it is seen as a fundamental human need and the key function of a water only company. Amongst a small proportion of customers, in both the workshops and quantitative survey, there was a feeling that there was room for improvement in this area. Across both the workshops and quantitative survey, over 90% of participants support SSC's long-term

ambition for improving the quality of water supplied. Most participants wanted to see the ambition achieved sooner than the proposed target. In terms of the desired investment effort, participants would like to see investment made in both working with landowners/farmers/industry and an increased spending to upgrade treatment works as quickly as possible to take advantage of better treatment processes.

Lead pipe removal was consistently seen as a priority in the workshops because of its potentially serious health implications. This was supported in the quantitative study, where just under two-thirds of participants who viewed lead pipe removal as the most important ambition mentioned health concerns as a reason. Removing lead pipes would also reduce the amount of chemicals added to the water to counteract the lead, which would bring about long-term cost savings in terms of spend on chemicals. All customers in the workshops supported the ambition, and over 90% of participants in the quantitative survey. There was a fairly strong preference for the costs of lead pipe replacement to be spread across all customers, rather than just those who still have lead supply pipes.

Leakage reduction was also viewed as important because many customers were surprised and concerned by the current amount of leakage and felt that it was a strong contributor to water shortages and perceived high prices. In the quantitative study, the three main reasons given supported this: to reduce wastage, prevent water shortages and save money. Again, over 90% of participants supported SSC's ambition. Most participants wanted to see the ambition achieved sooner than the 2050 national target.

Two other ambitions were explored in depth in both the workshops and quantitative survey due to customers having more choice regarding the ambitions: supply interruptions and WINEP. 80% of workshop participants supported the supply interruptions ambition and over 90% in the quantitative survey. In the workshops, following more discussion around the targets and the current situation regarding supply interruptions, there was a feeling that this should be less of a priority due to the perception that we were currently performing well. The trend was similar for WINEP with 89% of participants in the workshops supporting the ambition and over 90% in the quantitative survey.

Certain participant types did have higher priorities for some ambitions than others. For example:

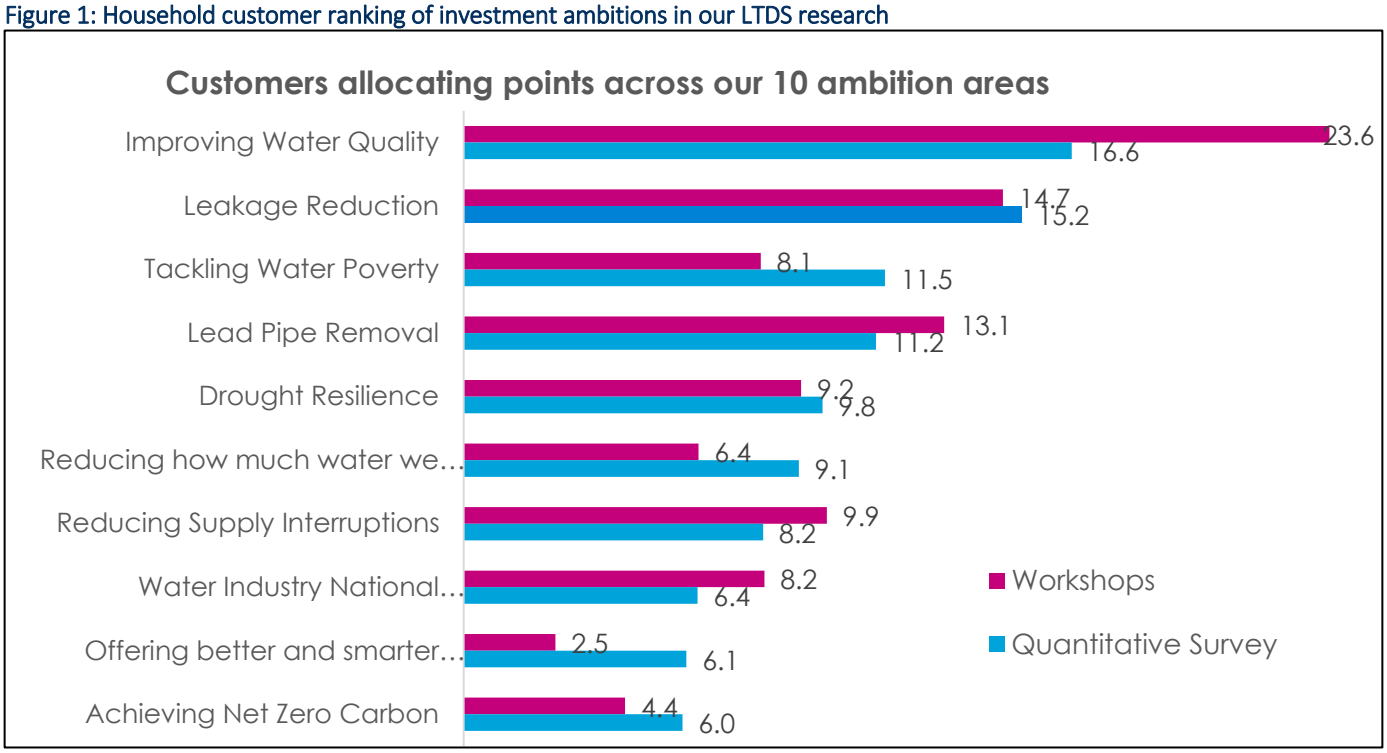
- Future customers ranked Water Industry National Environmental Programme / Biodiversity higher than other customers in both the workshops and quantitative survey and achieving net zero carbon higher in the quantitative survey.
- Non-Household customers felt that supply Interruptions were less important because South Staffs Water and Cambridge Water were already performing well in this area in the workshops, however, these customers ranked this ambition higher than other participant types in the quantitative survey. It's likely that supply interruptions are viewed as a priority at first glance given the potentially serious impact on non-household customers, and thus ranked relatively high in the quantitative survey. However, as seen in the workshops, closer inspection of SSC's current performance - which was perceived as being relatively strong – leads to this ambition being perceived as relatively less important.

A theme throughout the research was that participants generally wanted the ambitions to be achieved sooner than the target tested. Leakage was the highest percentage of customers (43%) saying they wanted the ambition target to be delivered before 2025. This is compared to supply interruptions where the figure was 25%. However, it must be noted that we did not provide Turquoise (our independent customer research agency) with context around bill impacts up to 2050 for all the ambitions to show to customers. Clearly customers support our ambitions overall, however, we then needed to triangulate with other sources of information such as Willingness to Pay (WTP) research to account for the desire to achieve these ambitions sooner than the proposed targets.

Conversations around who should pay for these ambitions, and the concept of intergenerational fairness, were generally consistent with the view being that it should be spread evenly across generations. There was, however, evidence in the quantitative survey for stronger support for keeping customer bills from rising more in the short-term over investing more now for the long-term future. We feel this is to be expected given the workshops allowed for discussions around the key issues around what is fairest when paying for long-term investments.

In both the workshop 'homework task' and the quantitative survey, participants were asked to allocate 100 points across the 10 ambitions using a slider approach. Figure 1 shows how household customers prioritised their points across the 10 ambition areas for investment. Whilst the customer priorities tracker looks at a wider range of areas and uses a Max-Diff methodology, we see consistent picture of providing a high-quality water supply, reducing leakage and ensuring water bills are affordable as the top three priority areas for customers. This provides strong evidence that we must prioritise investments in these three areas in both the short and long term.

Figure 1: Household customer ranking of investment ambitions in our LTDS research



Following the completion of our LTDS research in June 2023, we then worked with our PR24 research and triangulation partners, Impact Research, to develop a decision-making framework to evidence that our LTDS ambition and strategy reflects customers' priorities. Our approach is further described in section 1.4 of appendix 'SSC07 Customer engagement strategy and key insights' to show how customers informed our LTDS strategy, with the approach developed in collaboration with Impact to triangulate all our research to inform our LTDS decision making found in appendix: 'SSC33 Impact – SSC LTDS triangulation report'. The approach was also subject to independent academic peer review.

Intergenerational fairness for bill profiles up to 2050

A key part of our customer research involved gaining a robust understanding of our customers' views on intergenerational fairness. Specifically, around the phasing of long-term investments and what is fairest when considering the balance between the different generations of customers. Our approach has focused on conducting "high-quality" research with household, non-household and future customers to explore this complex and important topic to inform decisions in our plan. In our research studies, we also ensured that we heard the views of those who are harder to engage, such as large business decision makers and customers in vulnerable situations, and also those who can't or won't take part in research online. Our research approach for inter-generational fairness has focused on two main areas:

- Engaging through deliberative workshops and quantitative studies through our WRMP customer engagement and LTDS research study. As outlined in the previous section, the latter on 10 specific ambition areas to inform our LTDS, with a focus on preferences over the timing of investments to unlock the benefits that they will deliver; and
- Testing bill profile scenarios for investments up to 2050, which has been undertaken as an element of several research studies. These have covered deliberative customer sessions from:
- A collaborative research study to inform the Water Resources East regional plan;
- Our Customer Priorities Tracker qualitative sessions exploring long-term priorities; and
- AAT research – main qualitative and quantitative research with bill payers and with our Young Innovators' Panel.

The main conclusion is that these research studies have shown a consistent majority preference for an even, natural bill profile up to 2050 and that important investments should not be delayed. In particular customers:

- Continue to favour bill profiles that minimise bill shock as it helps them to budget effectively over time, particularly during periods where household and business finances are being squeezed by increases in the cost of living. Whilst there is wide acceptance that water bills need to go up to fund investments to ensure a resilient and high-quality service in the future customers are looking for water bills not to follow the same percentage increase trajectory as other bills over the last two years, such as energy.

- Mainly focus on what is "fairest for all generations" when considering long-term bill profiles, spreading the cost evenly so that no generation is adversely affected. However, customers are also looking for an investment approach that ensures key risks are mitigated and not left to suddenly emerge later down the line and cause service deteriorations and higher bill increases for future generations.

For more information on the evidence to support our conclusion please see section 1.5 of appendix: 'SSC07 Customer engagement strategy and key insights'

Stakeholder engagement

We engaged with our people, senior managers, Executive team and the Board to shape our long-term vision to 2050 – 'Looking to the future', which we published in November 2021. This long-term vision is reflected in chapter 1 of this document.

We have set up an independent stakeholder challenge panel of experts, with representation that covers our Cambridge and South Staffs regions. The role of the panel is to determine that our business plan and this strategy are good plans that will deliver measurable outcomes to customers, communities and the environment.

In particular, the panel's job is to assess whether:

- customer/stakeholder insight and research has been challenging and carried out with a view to properly understand customer/stakeholder outcomes;
- our plans reflect the wants, needs and aspirations of customers/stakeholder;
- our plans have been informed by insight; and
- our plans exist within a wider long-term framework to ensure future customer/environmental needs are addressed.

The Panel has also acted as a critical friend, helping us to shape our approach.

Engaging with expert stakeholders

As part of the LTDS research study engaging with expert stakeholders at the start of our LTDS research project gave us confidence that our approach was fit for purpose. This included engagement and feedback from our own independent non-executive director. The four stakeholders were provided with a briefing note about the project objectives and the methodology approach to assist them in providing feedback during the in-depth interview. A summary of the areas identified though the interviews where there was support for the proposed approach is detailed below:

- Both deliberative and quantitative stages included;
- Approach explores intergenerational fairness;
- Methodology ensures a good cross section of customers included, including harder to reach / vulnerable customers and future customers;
- Approach enables accessibility to relevant educational materials for customers to inform them; and
- Use of different media stimulus material to keep engagement up among participants.

We also drew on the suggestions made by the stakeholders during the depth interviews. The main points raised included the need for stimulus materials to make clear the level of investor returns and, where possible, bill impacts. It was also viewed as important to ensure customers were made aware of the key challenges that need to be addressed and the potential scenarios that might occur in the future. It was felt that this would help customers to express their preferences more accurately.

In response, we included details of investor returns in the stimulus materials and a balanced level of detail around the challenges we face and the ambitions we had to address them. However, due to the complexities of engaging customers with bill impacts on a 25-year investment period to deliver the 10 ambition areas and how these could change over time, we made the decision to focus the research on customer preferences and the timing of investments to unlock the benefits each would bring.








Part 2: Ambition – where we will be in 25 years

1. Our vision to 2050

Ours is a long-term business. As the successful provider of an essential public service for 170 years, we have always taken a long-term approach to business planning. Key to our long-term approach is the way we take account of customers' changing expectations and priorities over time, making sure we always anticipate these efficiently and effectively. This in encapsulated in 'Looking to the future' – our long-term vision for 2050.

1.1 Introduction

We are committed to developing plans to deliver the best service for our customers, our environment and our business. This means continuing to invest in sector-leading assets to enable us to carry on delivering high-quality water and excellent service to customers now and in the future. But we face a number of challenges that mean it is more important than ever for us to adopt a long-term adaptive planning strategy.

- Increased demand for water. By 2045, the population in our Cambridge region is forecast to increase by 19%, with 46,500 new homes expected to be built. Over the same time frame, the population in our South Staffs region is forecast to increase by 18%, with 125,000 new homes expected to be built.

- Changing rainfall patterns leading to a higher risk of flooding or longer periods of drought. Climate change means we are likely to see more extremes of weather, with 60% less rainfall in the summer and 30% more rainfall in the winter in our Cambridge region by the 2080s. The equivalent numbers in our South Staffs region are 50% and 30%, respectively. In the UK, ten of the warmest years on record have occurred within the past two decades.

- The need to further reduce leakage on our network. Across our Cambridge region, around 16% of treated water is lost to leaks every day; the figure is around 21% in our South Staffs region, which is roughly the same as the national average. Around a third of all leakage comes from customers' supply pipes. We need to consider holistic solutions designed to tackle leakage in the round.

- The need to reduce carbon and other greenhouse gas emissions. To help combat the impact of global warming, we have committed to play our part to help the water sector in England and Wales achieve net zero operational carbon emissions by 2030.

- The need to encourage more water efficiency. This means using a combination of education and awareness-raising campaigns to inform customers about the need to use water wisely, and value it as a precious and finite resource. It also means encouraging more water recycling in homes and businesses across our Cambridge and South Staffs regions.

- The need to protect the water environment. Abstracting water from rivers and underground aquifers for public water supply could lead to a deterioration of the environment. This is particularly true for the rare chalk stream habitats that are a feature of our Cambridge region. Currently, only 14% of rivers and water courses in England are classed by the Environment Agency as being in ecologically good condition – that is, healthy and able to recover if damaged.

- Making sure our services are always accessible to all customers. This means making sure help is available to all customers who need it when they need it. And it means proactively providing a range of financial support and advice to those who are struggling to pay their water bills.

At the same time, we have to make sure the bills our customers pay remain affordable, and that we continue to ensure the long-term resilience of our water services to meet these challenges.

1.2 Dealing with the challenges we face

We have an ambitious, long-term vision for our business that aims to demonstrate our value to customers, our communities and to wider society. It also aims to demonstrate our commitment to protecting and enhancing the natural environment. To deliver this vision, we are focusing on the following priorities.

- Eradicating water poverty. This means keeping our customers' bills affordable and using smart data to identify those who may be struggling to pay their bills. It also means offering the right levels of help and support in the right way and at the right time to all those customers who need it.

- Protecting and enhancing the natural environment. This means abstracting less water from the environment to restore river flows. It also means working with farmers and

landowners to improve water quality by minimising agricultural run-off. And it means creating or enhancing habitats that support a wide variety of plants and wildlife. Our ambition is to leave nature in a better state for future generations.

- Adapting to a changing climate. This means encouraging sustainable practices within our business and our supply chain. It includes using renewable energy, having a fully electric vehicle fleet, and making sure our network of treatment works, pipes and pumping stations is resilient to extreme weather events.

- Meeting the needs of a growing population. This means developing new water sources, such as the Fens reservoir with Anglian Water to supply customers in our Cambridge region. It also means making the most of our existing water sources, and encouraging developers to install water recycling systems to help customers reduce how much they use in their homes and businesses.

- Remaining financeable over the long term. This means taking more advantage of green or sustainable financing initiatives, while continuing to always meet our legal, regulatory and financing obligations.

At the same time, we will need to take into account the changing expectations of our customers, stakeholders, regulators and investors over time. This could mean us placing more emphasis on one priority over another at times, or it could mean adapting our activities to reflect a change in circumstances. Key to this remains the need for us to understand fully our customers' needs and priorities, and to be embedded at the heart of all the communities we serve.

Figure 2: Where we are now

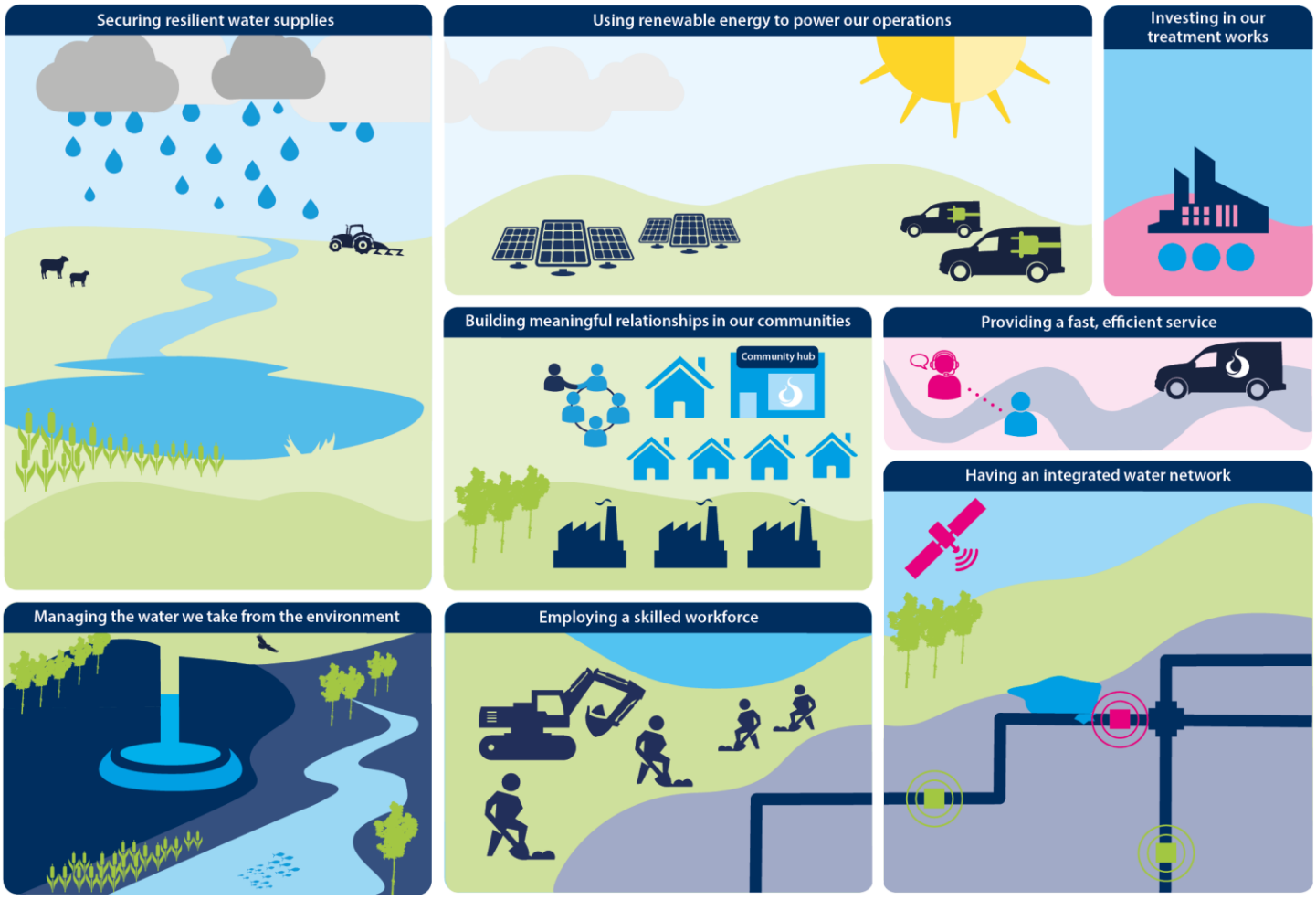
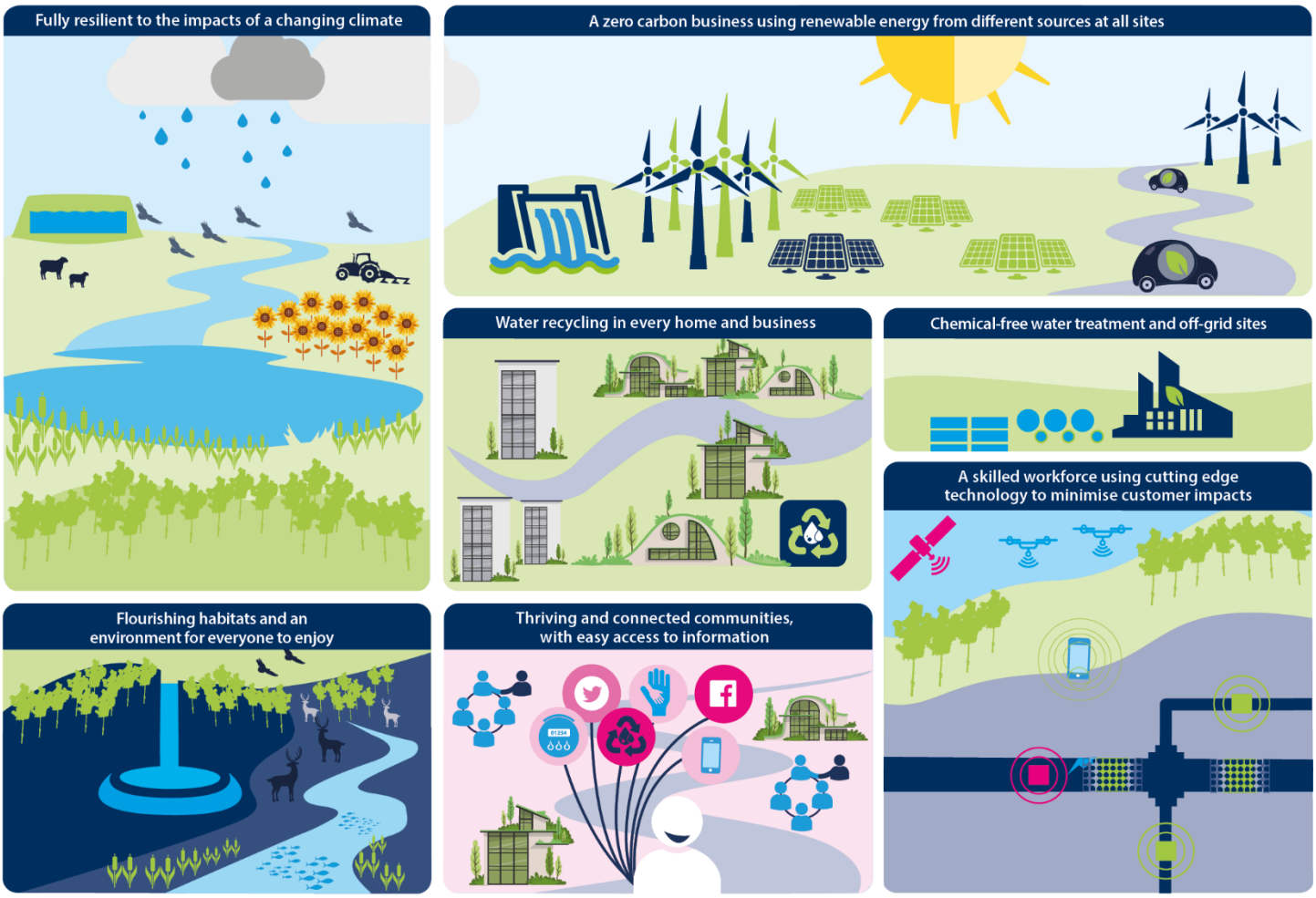


Figure 3: Where we will be in 2050



1.3 Our long-term ambitions

Our business plan for the five years from 2020 to 2025 focused on delivering five key outcomes for our customers, our communities, the services we deliver, the environment and our business. These outcomes reflect the areas where our customers told us they want to hold us to account.

We believe these overarching themes still apply to our long-term plans. So, we have used them to develop five the following five ambition statements with our people and the Board, which sets the context for our vision for 2050.

- Our service. We will use cutting edge technology and ensure the infrastructure is in place so that customers always receive resilient, high-quality water supplies.
- Our environment. We will lead in protecting and enhancing the environment – working with partners to ensure sustainable water supplies and flourishing local habitats.
- Our customers. We will innovate to exceed customers' expectations of our service, end water poverty and make sure help is always available.
- Our communities. We will use partnerships and education to lift our communities, creating space and opportunities to help people work and thrive.
- Our business. We will lead in adapting to climate change and will run a safe, efficient and sustainable business, with a highly-skilled workforce.

In the following sections, we consider what each of these ambition statements mean for customers, other stakeholders and the environment, and how we plan to achieve them. As the current custodians of this long-term delivery strategy, we have a responsibility to deliver continual improvements to help us achieve our long-term goals.

1.3.1 Delivering excellent service

Our long-term goals for excellent service

- We will constantly review our water treatment processes to ensure we always **deliver the highest quality water to our customers**, using the most sustainable and efficient net zero carbon methods.
- We will explore the most **efficient new technology solutions** to help us deliver step changes in service performance.
- We will manage our assets proactively to ensure **resilient and sustainable water supplies**, now and in the future.

1.3.1.1 High-quality water

Delivering consistently excellent water quality is a top priority for our customers. To achieve our long-term vision, we will explore the following.

- Upgrading our water treatment works. We will use innovative, sector leading treatment technology to push the boundaries of water quality improvement.
- Chemical-free water treatment. We will look at sustainable ways over time to reduce our reliance on the chemicals we use in our treatment processes, while maintaining the high-quality water supplies our customers expect and pay for.
- Adapting to regulatory and legislative changes. We will comply with all new legislative and regulatory requirements relating to newly-identified or additional contaminants (such as lead and PFAS/PFOS compounds – the so-called 'forever chemicals'), while continuing to go above and beyond for our customers.

1.3.1.2 Cutting edge technology

It is an exciting time for innovation in the water sector as new technology is being developed and trialled that will help us to achieve our service ambitions. Some of the areas we are already looking at include the following.

- Investing in smart networks. We will invest in new technology that can predict when pipes and other assets might fail. This will help to reduce leakage, pipe bursts and unplanned interruptions to our customers' water supplies.
- Introducing smart meters. We think installing smart meters will give our customers more control over when and where they use water at home and at work, helping them to save water over the long term and value it as a precious and finite resource. We will look to stop installing meters that have to be read manually after 2025. This will help to reduce our data collection costs and improve customer transparency.
- Data system improvements. Improving data systems goes hand-in-hand with implementing a smart network. We will expand our system capacity, enabling us to better analyse data. This will inform our approach to maintaining our assets in the most efficient way. This, in turn, will improve the resilience of our water supplies, and help our customers to save money. Sharing this data with others will give us the potential to accelerate improvements through wider collaboration.

1.3.1.3 Resilient assets

It is critical that we replace and maintain our assets to secure resilient water supplies into the future. We will continue to develop our approach to long-term investment planning by focusing on the following.

- No regret options. We will always use 'no regret' investment options where they are available. This means we will use methods that are guaranteed to have no downside before we make big investments to solve a problem.
- Adaptive planning. We will develop adaptive plans that can flex to accommodate changing circumstances. We will produce plans that provide visibility and accountability around how our long-term strategies will change in the face of future uncertainties.

1.3.2 Delivering for the environment

Our long-term goals for the environment

- We will **manage the water we abstract from the natural environment sustainably**, returning all rivers and water courses to 'good' ecological status by 2050.
- We will **enable our customers to better manage their water supplies**, through the encouragement of greater use of water recycling systems, rainwater harvesting, water saving devices and water efficient homes.
- We will **improve the biodiversity of our sites**, to ensure flourishing habitats while creating green and blue spaces in our communities for customers, visitors and other stakeholders to enjoy.

1.3.2.1 Sustainable water supplies

As we face the challenges of climate change and population growth, it is vital that we manage our water sources carefully and protect our rivers – particularly the chalk streams in our Cambridge region. We already develop and implement 25-year water resources management plans that describe how we will meet the demand for water over the long term.

We are also key members of Water Resources East in our Cambridge region and Water Resources West in our South Staffs region, and are working in partnership with other water companies and key stakeholders to produce regional water resources plans that consider the needs of all water users to 2050 and beyond.

At the same time, the Environment Agency has set a national target reducing the frequency for when water companies need to use extreme restrictions such as standpipes or water rationing during sustained periods of drought. To ensure we can continue to deliver sustainable water supplies over the long-term, we are focusing our attention on the following.

- Using alternative water sources. By investing in new reservoirs and regional water transfers, we will be resilient to the Environment Agency's requirement for us to only use extreme restrictions as outlined above once in every 500 years (that is, a 0.2% chance each year of needing to introduce such restrictions), by 2040. We currently plan for a resilience level of once in every 200 years (that is, a 0.5% chance each year of needing to introduce such restrictions).

- Delivering sustainable abstraction. We will reduce the volume of water we abstract from rivers and underground aquifers to restore and improve the natural environment across our Cambridge and South Staffs regions. This includes protecting and enhancing the chalk stream habitats in our Cambridge region, improving water quality and restoring river flows.

1.3.2.2 Reducing water demand

While our plans for water supplies over the long term will help to mitigate the environmental impact of our activities, they must be complemented by reduced demand to maintain these supplies in the future. We will work with customers, developers and regulators to reduce the volume of water each person uses every day (that is, per capita consumption or PCC) from more than 150 litres a day now to less than 110 litres a day by 2050. We will also consider the following.

- Water recycling. We will work with developers and local communities to encourage the development and installation of systems that help our customers to recycle water and reduce consumption in their homes and businesses. This will mean that highly treated drinking water is not used for everyday activities such as flushing toilets and washing windows.

- Building water efficient homes. We will work in collaboration with developers across our Cambridge and South Staffs regions to design state-of-the-art water efficient homes and appliances to help customers use less water. Through Water UK, the organisation that represents water companies, we will also lobby the UK Government to influence building regulations and planning policy to ensure individual water usage levels of 80 litres a day can be achieved from building water efficient new homes.

- Further leakage reductions. We have already accelerated our leakage reduction programme over the past few years. But we will look to tackle leakage further by using new, innovative and disruptive methods to find and fix leaks quickly, and protect our water supplies.

1.3.2.3 Flourishing habitats

As river flows and groundwater levels are returned to their natural levels across our Cambridge and South Staffs regions, more plants and wildlife will be able to thrive. As the current custodians of these resources, we are focusing our attention on increasing and protecting biodiversity for future generations to enjoy. We will do the following.

- Protect and enhance chalk stream habitats. We are working in partnership with others to restore and enhance all the chalk streams in our Cambridge region over the medium term, with work starting in the five-year planning period from 2025 to 2030 (AMP8). As well as considering water volume and quality solutions, this work will also explore hydrological and habitat improvements.

- Develop new strategic water resources. We are working in partnership with Anglian Water to develop a new strategic reservoir in the Fens, which we hope will be operational and supplying customers in our Cambridge region by the mid- to late-2030s. This will help to reduce our reliance on the need to abstract water from the aquifer that feeds the chalk streams in our Cambridge region.

- Enhance our blue/green spaces. By protecting and enhancing our local environments, we will continue to support wellbeing and recreation for the people in our communities to enjoy. We will further consider how to best use these spaces, including creating visitor centres and other amenities, and encouraging different leisure activities, to ensure our customers get the most out of them.

1.3.3 Delivering for our customers

Our long-term goals for customer service

- We will keep **water bills affordable** for all our customers.
- We will increase the **choices of how customers want to interact with us** to create lifelong advocacy.
- We will use new technology to provide an **instant service and proactive updates** for our customers.

1.3.3.1 Affordability

We recognise the impact the current cost of living crisis is having on many of our customers. We currently have one of the lowest water bills among the water companies in England and Wales. We will strive to keep water bills affordable in the future and end water poverty. To meet this ambition and give our customers confidence that their bills will remain affordable now and over the long term, we will do the following.

- Differential water tariffs. We will explore innovative ways to allow customers to be rewarded for reducing the volume of water they use and give them greater control over their bills. We recognise that we currently face challenges around the existing regulatory framework and the availability of data. So we will take steps every five years to work towards this improved, more responsive approach to charging.

- Vulnerable customer support. We already have a number of tools in place to support customers who are struggling to pay their bills. But we will look at more ways to proactively identify and support customers in financial hardship, empowering them by providing access to new tools and technology.

- Partnership and collaboration. We recognise strong partnerships and collaboration will be essential if we are to achieve our long-term goals and deliver lasting service improvements. We will explore innovative approaches and seek third party funding to co-create these improvements where possible to reduce the burden on customers through the bills they pay.

1.3.3.2 Customer choice

- Communication channels. We will make sure we meet all our customers' needs by keeping up to date with the latest technology and customer service developments to provide a preferred method of communication and engagement at all times.

- Digital deprivation. We have an ageing population and pockets of digital deprivation across our Cambridge and South Staffs regions. This means that some customers may not have access to or be familiar with new communication channels, or may simply prefer to use non-digital and face-to-face services. We will support all our customers by being flexible and providing easy access to new communication channels and tools, so that no one is left behind.

1.3.3.3 Proactive customer service

- Technology. We will continue to monitor our network of reservoirs, pipes and pumping stations, investing in our existing assets and exploring new developments in technology. We will also increase data availability and insight to allow us to better predict when there may be a service issue (such as supply interruptions or water quality problems) before our customers are impacted or need to notify us, and give regular updates as required.

- Customer contacts. We will minimise unwanted contacts and resolve any customer issues first time by providing an instant service, using our diverse communication channels and data rich insights to provide a seamless service experience.

1.3.4 Delivering for our communities

Our long-term goals for our communities

- We will **educate customers on the long-term challenges we face** and the role they play in helping us to deliver our plans.
- We will be **visible and accessible within all the communities we serve**, including those that are traditionally harder to reach.
- We will **lead by example as a business**, engaging with and listening to our communities, and delivering what they want.

1.3.4.1 Educating our customers

The communities we serve play a key role in helping us deliver our ambitious strategy, particularly for encouraging more water efficiency and reducing demand. It is our responsibility to educate our customers on the long-term challenges we face and the ways they can support us in ensuring we continue to provide resilient and sustainable water supplies for future generations.

- Schools. We already work with primary schools across our Cambridge and South Staffs regions to help younger generations learn more about the value of water. As this is an important and effective way of sharing information with our customers, we will continue to expand this approach. This will enable us to engage with even more young people and encourage water efficiency among future generations.

- Awareness of all customers. As the impacts of climate change and population growth become more prevalent, the importance of encouraging behavioural change among our customers is critical. We will consider how we can effectively tailor our communications to customers with different preferences and in all life stages.

1.3.4.2 Visibility and accessibility within our communities

Over the past few years, we have had great success in engaging with our local communities. This approach is mutually beneficial as we learn how to better serve our communities by listening to and supporting them; in turn, we become recognised as a valued and trusted business that delivers public and social value. We will build on this approach by embedding ourselves within the communities we serve. This will ensure we are visible and accessible to all our customers.

- Partnerships. By collaborating with local groups and organisations, we will provide opportunities to educate and inform our communities about the ways we can help them, and how they can work with us in return. This will enable us to engage effectively and listen to what our communities want from us in the future. These could include local businesses, religious groups, universities and charities.

- Inclusivity. We value the diversity of the communities we serve. We believe that no one should be left behind as we focus on improving our business. We will strive to support our hard-to-reach communities, providing additional support where necessary to ensure we always give our customers the best possible service. This will take into account language, disability and technology accessibility considerations, as appropriate.

- Community presence. We will build on the success of our award-winning community hub, our 'water on wheels' initiative and our participation in local events. We will adapt these successes in line with our customers' future needs and requirements.

1.3.4.3 Leading by example

We understand that we can represent and influence our local communities. As one of the smaller water only companies in England and Wales, we can focus our time and attention on being a sector leader on delivering public and social value and purpose, and supporting the communities across our Cambridge and South Staffs regions.

- Employment opportunities. We will encourage and train the next generation of water sector experts across our business. We will do this by continuing to expand our

apprenticeship scheme, and by implementing other training and development programmes. We will consider opportunities to engage with schools and universities across our Cambridge and South Staffs regions, and will reflect the diversity of the communities we serve in our recruitment.

- Demonstrate our sustainability. As we engage with our local communities on the challenges we face as a business, we will evidence the work we are doing internally to deliver our ambitious plans.

- Listening to our customers. We understand the value in engaging with our local communities to deliver the changes they want. We will continue to engage with our customers and act to deliver their priorities, whether this is about the financial help and support we provide, or about the local environment.

1.3.5 Delivering for our business

Our long-term goals for our business

- We will play our part to deliver the water sector's ambitious **net zero operational carbon emissions target** by 2030. And we will not add any extra carbon or other greenhouse gas emissions from our operations into the atmosphere by 2050.
- We will run a **safe, efficient and sustainable business** that is agile and able to respond to the challenges of a changing climate and a growing population.
- We will continue **to invest in our people to make sure we have the diverse range of skills we need** to adapt to changing circumstances and a workforce that reflects the communities we serve.

1.3.5.1 Net zero carbon emissions

To help limit the dangerous impacts of global warming on people and the environment, we will reduce our carbon emissions from our operations into the atmosphere by 2050. This includes both our own operational emissions and the embedded carbon associated with our supply chain. These actions will help to reduce the frequency and intensity of extreme weather events (such as heatwaves, heavy rainfall and droughts). As part of this, we will do the following.

- Reduce our carbon emissions. We will look at all the options available to us to reduce carbon and other greenhouse gas emissions from our operations. This includes having a fully electric vehicle fleet and using the most energy efficient processes to maintain our network of treatment works, pipes and pumping stations.

- Exploring renewable energy options. As our treatment and distribution processes are inherently energy intensive, we will explore renewable energy options from external suppliers and internal generation. These may include, but are not limited to, wind power, solar power and biofuel gas.

- Working with our supply chain. We will use efficient procurement processes and in collaboration with our suppliers will reach our net zero embedded carbon target by 2050. As part of this, we will prioritise environmental criteria.

1.3.5.2 A safe, efficient and sustainable business

We are one of the most efficient companies in the England and Wales water sector. We also aspire to be a zero accident workplace and take the health, safety and wellbeing of our people seriously. To ensure our people can continue to deliver the best possible service to our customers now and in the future, over the long term we will do the following.

- Create the right working environment. We will ensure our people's experience of working for us is a positive one, with a hybrid working model where possible and sustainable office spaces. We will continue to promote a safety first mentality across all our sites and actively promote wellbeing initiatives.

- Drive efficiencies across the business. We will continue to operate our business efficiently, making greater use of remote technology and enhanced IT systems for all our people. We will also use digital twins as the norm, with everything monitored through smart systems.

1.3.5.3 A skilled workforce

As we face new challenges and our business develops, it is important that we continue to invest in all our people. This includes making sure we recruit and retain the right people, and that training is available to keep everyone's skills up to date. But we also want to ensure that we keep our people engaged and that we score highly on employee engagement metrics. Continuing to achieve Investors in People (IIP) or similar accreditation over the long term is a key part of this.

- Recruitment and retention. We will continue to use our apprenticeship, succession planning and development schemes to make sure we always recruit and retain the right people. This includes making sure the people we recruit can adapt to changes in our technology and operational circumstances.

- Skills and development. We will continue to ensure our people always have the skills and development opportunities they need to do their jobs effectively.

- Employee engagement. It is clear that an engaged workforce drives the best outcomes for our customers and our business. Throughout the period we will continue to listen to our people, take on board their ideas and actively strive to further enhance our employee engagement.

2. Developing long-term outcomes

Supporting the delivery of our long-term ambition and vision to 2050 are the outputs of a number of key strategic frameworks. We have considered these strategic frameworks in the round, enabling us to develop a holistic approach to service commitments over the long term.

These frameworks include:

- the latest WRMPs for our Cambridge and South Staffs regions;
- our water industry national environmental programme (WINEP) obligations for AMP8;
- the UK Government's targets, as they relate to water and biodiversity, in particular; and
- the customer and stakeholder preferences we have used to inform our long-term performance commitment (PC) targets and outcomes.

In the following sections we consider how setting long-term PC targets and delivering our WRMP outcomes will help us to deliver our visions 2050.

2.1 Setting long-term performance commitments

We have set long-term forecasts for all the common PCs that Ofwat is using as part of its PR24 price review process, with the exception of the relative performance targets that focus on the service we deliver to customers (C-MeX, D-MeX and BR-Mex).

We have also taken into account the long-term forecast targets from our WRMPs – leakage and household and non-household water consumption. These align with specific UK Government targets as laid down in the Environment Act 2021 and sector-specific targets as set out in Water UK's PIC. For our commitments around supply interruptions, water quality contacts, mains repairs and unplanned outage, we consider a range of data and information to develop our forecasts. These included:

- our performance during AMP7 to date (2020 to 2025);
- our historic track record of improvements made; and
- forward-looking trends to deliver upper quartile performance.

Over time, targets are to be more challenging for us to achieve, as we reach the limits of current technologies and processes. But, in the future, we might expect new technologies and ways of working to emerge that help us continue to push those boundaries on service performance forward. For some performance commitments, such as leakage, there are externally driven targets that we are aiming to meet, so our long term forecasts align with these. Some other performance commitments, such as supply interruptions, are already operating at such a high level of performance overall that it is more difficult to make the same level of gains continuously. For these PCs, we have taken an incremental improvement approach which assumes continued improvements over the long term but not at a linear pace, and so these targets do not ultimately reach a 'zero' level of performance, as in a distributed asset base that we operate it is likely that there will always be service risk that may impact customers. We will do what we can to minimise this risk, through sound investment decisions over the long term and by focussing on asset health and resilience.

As well as aligning with our vision to 2050, this approach has the support of our customers and stakeholders. The customer evidence is described in more detail on our website in the customer research area in the 'LTDS research and triangulation report' which shows the support for our ambitions, including where we would prioritise our efforts and where we should go faster to achieve our ambitious targets. We have summarised our long-term PC targets in table 2 below. We discuss the targets for the five years between 2025 and 2030 (AMP8) in more detail in 'Securing your water future – South Staffordshire Water's business plan 2025 to 2030'.

Table 2: PC targets, forecast to 2050

Theme	PC	Current performance 2022/23	Target performance 2029/30	Forecast performance 2050
Customer service	C-MeX	c.8th	UQ[1]	n/a – based on relative performance
	D-MeX	c.7th	UQ	n/a – based on relative performance
	BR-MeX	n/a	UQ	n/a – based on relative performance

Theme	PC	Current performance 2022/23	Target performance 2029/30	Forecast performance 2050
Water supply and quality	Supply interruptions (mm:ss)	03:15	02:30	00:53 – non-linear incremental returns
	CRI	1.47	0	0 – based on compliance
	Water quality contacts per 1,000 of population	0.71	0.44	0.09 (30% reduction per AMP) – based on marginal returns[2]
Asset health	Mains repairs (per 1,000 km)	150.7	113.4	85 – non-linear incremental returns
	Unplanned outage (%)	3.72	2.53	0.91% (23% reduction per AMP) – based on marginal returns[2]
Environment	Biodiversity (Natural England Biodiversity units/100 km^2)	n/a	84.73	n/a – new measure
	Operational GHGs (tonnes, CO2e)	60,946	57,454	0 (including PPAs) 26,525 (not including PPAs)
	Leakage – Cambridge region (Ml/d, annual)	13.4	10.6	50% reduction (from 2017/18 levels) – however aiming to hit earlier by 2040 as per WRMP forecast
	Leakage – South Staffs region (Ml/d, annual)	65.3	50.0	50% reduction (from 2017/18 levels) – as per WRMP forecast
	Household PCC – Cambridge region (l/p/d, annual)	136.0	121.4	122 l/p/d by 2038 and 110 l/p/d by 2050 as per WRMP forecast dry year values
	Household PCC – South Staffs region (l/p/d, annual)	142.9	129.8	122 l/p/d by 2038 and 110 l/p/d by 2050 – as per WRMP forecast dry year values
	Non-household consumption – Cambridge region (Ml/d, annual)	25.2	28.8	9% by 2038 and 15% reduction by 2050 – as per WRMP forecast
	Non-household consumption – South Staffs region (Ml/d, annual)	60.9	56.9	9% by 2038 and 15% reduction by 2050 – as per WRMP forecast
	Discharge permits compliance (%)	86.21	100	n/a – new measure
	Serious pollution incidents (number)	0	0	n/a – new measure

Notes:

1. UQ = upper quartile performance among the regulated water companies in the England and Wales water sector.
2. Based on track record improvements and PR24 forecasts of trend to UQ

As illustrated in the table above, we have based our 2050 targets on non-linear incremental returns for four of our PCs – supply interruptions, water quality contacts, mains bursts and unplanned outage. Our core pathway delivers on these targets. Figures 4 to 7 below illustrate the trajectory for our combined Cambridge and South Staffs regions to reflect our proposed PC target ambitions.

Figure 4: Supply interruptions

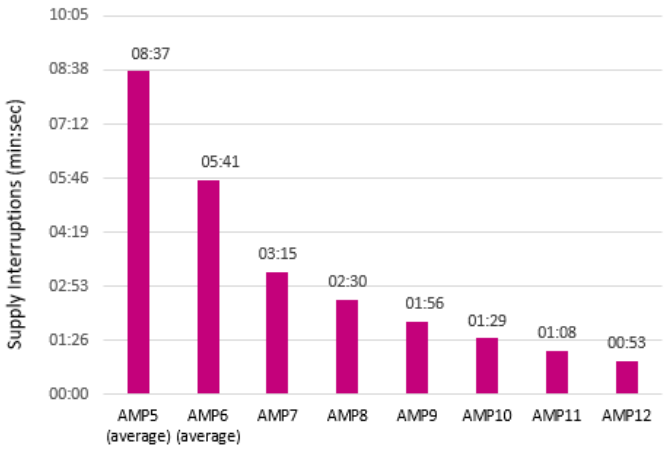


Figure 5: Water quality contacts

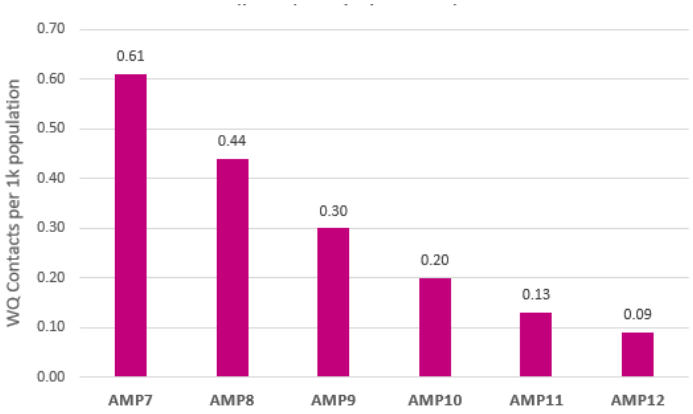


Figure 6: Mains repairs

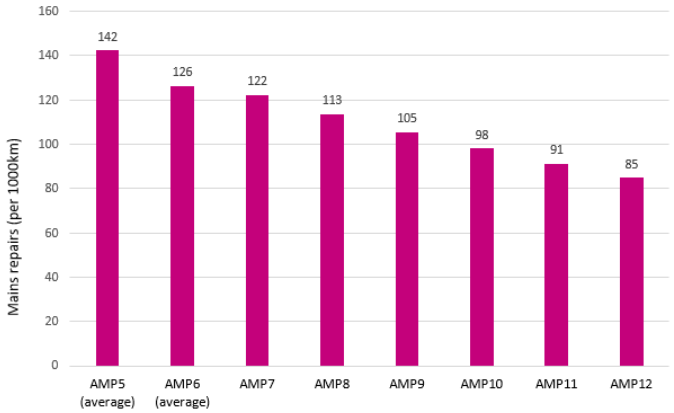
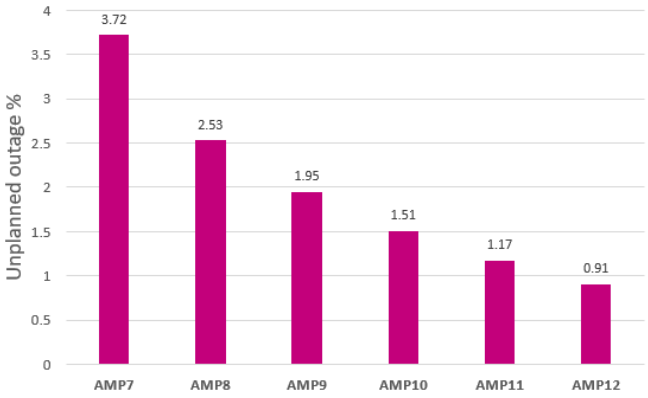


Figure 7: Unplanned outage



2.2 Delivering long-term outcomes for our customers and the environment through our WRMPs

The WRMPs for our Cambridge and South Staffs regions provide a strong framework for long-term planning. They support our vision and outcomes for customers and the environment over a 25-year time frame. At the time of writing, we had published our draft WRMPs for the period from 2025 to 2050.

Our latest WRMPs focus on the following core themes.

- Environmental enhancement and protection. We have considered the impact of our operations on the environment and have included reductions in the volume of water we can take from sources that the Environment Agency considers present a risk of deterioration to the environment. This includes the abstraction reductions relating to our WINEP obligations and investigations we will carry out in AMP8 to determine the level of further abstraction reductions that will be required beyond 2030. In our Cambridge region, restricting our licences to address this risk will lead to an immediate deficit in our supply/demand balance. We face significant challenges to meet the needs of the environment and manage growth over the long term, and have addressed these in our Cambridge region WRMP with a combination of supply-side options, including constructing a new reservoir in the Cambridgeshire Fens in partnership with Anglian Water, and an extensive demand management programme.

- Drought resilience. Our WRMP proposals will also help to make us more resilient to extreme drought events over the long term. Our ambition is to be resilient to a 1-in-500-year drought event before 2040. This means reducing the chance of severe restrictions such as rota cuts or standpipes to once every 500 years – or a 0.2% chance each year of having to put these restrictions in place.

- Demand management. Our demand management programme is at the heart of our plans to meet the water supply needs of our growing population in our Cambridge and South Staffs regions, while making sure we reduce our impact on the environment. Our engagement insight suggests that customer prefer and support plans that focus on demand management options, while making sure we have the appropriate support mechanisms in place to protect large families and customers who may find themselves in vulnerable circumstances – for example, with the transition to universal metering between 2025 and 2035 (AMP8 and AMP9). As outlined above, in our Cambridge region we have put forward a combination of demand- and supply-side options in our WRMP, while plans for our South Staffs region focus solely on demand-side options.

In table 3 below, we summarise the key outputs from the WRMPs for our Cambridge and South Staffs regions.

Table 3: Key WRMP outputs – Cambridge and South Staffs regions

WRMP output	Cambridge region	South Staffs region
Sustainable abstraction reductions	26 Ml/d implemented by 2030 (evidenced based claim to delay around 15 Ml/d to 2032)	18.39 Ml/d implemented by 2030
	WINEP investigations to determine the level of further abstraction reductions required to meet environmental destination reductions in supply between 2036 and 2040 of around 35 Ml/d (to be confirmed).	
Demand management options	20% leakage reductions by 2030	15% leakage reductions by 2030
	Demand management options (leakage, metering and water efficiency measures) offsets proposed growth levels in demand in both regions and reduces our environmental impact. Across both regions our plans will achieve: • 50% reduction in leakage (from 2017/18) levels by 2050; • 110 l/p/d household consumption by 2050; • 9% reduction in non-household consumption by 2038; and • 20% reduction in DI per capita by 2038. The key enablers for us to deliver these targets are: • delivery of the UK Government's water labelling scheme for white goods by 2025; and • completion of our universal metering programme across both regions by 2035.	
Supply-side options	Bulk transfer water import from Anglian Water's Grafham Water reservoir (around 26 Ml/d by 2032) Optimising sustainable abstraction licences Re-using and storing water from water recycling works Working in partnership with Anglian Water to develop a reservoir in the Cambridgeshire Fens, which will be used for winter water storage and which will deliver around 44 Ml/d into our Cambridge region by 2036 Q small supply option delivering around 9 Ml/d between 2040 and 2050	No supply options required; deficits up to 2050 can be met through demand management options as outlined above

2.3 Balancing base and enhancement expenditure to deliver our long-term commitments

We are delivering our performance commitments through a combination of both base and enhancement expenditure. Within base expenditure we assume there are efficiency and productivity improvements over time – either through direct cost efficiencies or from improving our performance and delivering more for the same cost. Enhancement is also required to deliver long term step changes and continuous improvements over time.

In general, productivity across the water sector has improved over time, as the mechanisms used in the price review process have incrementally driven more efficient costs and more stretching performance improvements. For the purposes of a long-term strategy, we think it is less important whether an investment is categorised as base or enhancement. Ultimately what matters is what customers pay for the service and receive back in benefits and service improvement. Whilst Ofwat's process currently evaluates base and enhancement costs separately, customers see a single bill and a level of service from their suppliers and the end result is what matters.

However, the process for PR24 asks us to evaluate the degree of performance improvement that we project might be able to be delivered from base expenditure, and the degree of improvement that might require further enhancement activity over the long term to deliver continued improvement. We consider that over the long term, base and enhancement activity support each other and work together to deliver long term service improvement. Service performance, as measured by the current package of common performance commitments, is outcome based. This means it is more difficult to quantify the contribution from different activities and costs to specific performance improvements because the outcomes measure the broad range of service that all of our activities collectively deliver. For example, our industry leading supply interruptions performance is delivered through a combination of resilience, supported by both enhancement improvements to resilience and long-term asset maintenance activity, and through good operational processes including how we respond to events. It is difficult to evaluate how much each of these things contributes to the performance level we achieve.

We have however tried to make links between enhancement activity and performance where possible. For example, the environmental improvements we make in our WINEP programme are funded from enhancement expenditure only, within each price review period. Enhancement expenditure also directly funds water quality compliance improvements, growth in population and the associated investments that requires, and our activity to reduce water demand.

In the sections below we explain the assumptions we have made for each performance commitment.

2.3.1 Supply interruptions

Our performance in this area over the past ten years has been characterised by:

- less frequent bursts, as a result of consistent infrastructure renewals expenditure (IRE) over successive AMPs;
- process improvements, using calm network techniques;
- improvements in the way we deliver planned works, which has resulted in customer interruptions being close to zero;
- a focus on minimising interruptions during unplanned events as a result of zoning decisions and aiming to restore customers' supplies as quickly as possible;
- improving our water supply zone resilience in a targeted manner; and
- using improved instrumentation and smart technology to help us make better decisions and enhance our response to customers.

Traditionally, many of these things have come from our base expenditure plans, although we would classify resilience and instrumentation as enhancement in principle as they generally represent a step change in performance and new assets. We also think our broader enhancement programmes, such as laying new mains to account for growth and the periodic improvements we make to our treatment works or service reservoirs, also help to improve our supply interruptions performance. And although we do not have an existing mechanism quantify this, the contribution over time is apparent. We have therefore attributed long term performance improvement entirely to base expenditure, however it is important to still recognise the indirect links to long term enhancement improvements.

Looking to the future – tackling supply interruptions

As we have achieved close to zero supply interruptions performance from planned works over successive AMPs, we will look to reduce interruptions from unplanned events further to drive additional improvements. This will require changes to operational working practices and a continued reduction in burst frequency as a result of IRE spend.

But we will also need to improve our operational resilience and redundancy, and the technology we use – which both fall under enhancement expenditure. Our AMP8 business plan describes how we will tackle this over the five years from 2025 to 2030.

It is important to note that while we take our resilience duty seriously, it would not be cost effective for us to mitigate all risks from our network – and some eternally driven circumstances are still likely to generate supply interruptions. Our responsibility is to minimise any potential impact and ensure customers' welfare is protected when events do occur.

2.3.2 Water quality compliance (CRI)

Water quality compliance is a well-established performance area with an extensive history. Prior to the utilisation of the current metric, CRI, water quality compliance was measured using other metrics, such as mean zone compliance, and also some additional metrics which formed part of asset serviceability assessment. Improved compliance comes wholly from new or improved assets to mitigate emerging risks on those assets or to meet new legislative compliance standards. So, our view is that it is almost all enhancement driven expenditure underpinned by our business as usual activity. We acknowledge that internal process improvements may also deliver benefits. As we modernise our systems over time, we also improve our assessment of risk and modernise our monitoring. However as the current and long term targets for compliance are already zero, enhancement in this case is used to sustain this level of performance against emerging risks.

Looking to the future – ensuring water quality compliance

On balance, we would expect that asset enhancement has played a significant role in helping us to meet new standards of water quality over time. Modernising some of our processes has also delivered improvements in this critical area. Looking ahead, our focus will be on improving our assessment of risk alongside carrying out activities to mitigate risk through asset enhancement that will drive changes in the future. This includes the work we will be carrying out in AMP8 to deliver enhanced water quality for our customers.

2.3.3 Customer contacts about water quality

Over the past ten years, our activity has focused on managing incidents of discoloured water. This includes carrying out:

- advanced cluster analysis;
- calm network activity;
- targeted mains flushing;
- PODDS modelling[1];
- water supply zone risk assessments; and
- the optimisation of source works for metals.

Ongoing IRE activity has also helped to improve the general condition of our networks and our ongoing compliance with the DWI's stringent water quality standards.

Looking to the future – reducing customer contacts about water quality

Over the long term, customers will benefit from the enhancements we have made on our networks over the past ten years and also from the investment we have made during the current AMP in the largest water treatment works in our South Staffs region – Hampton Loade and Seedy Mill. As with our supply interruptions performance, there is an element of resilience and healthy assets within broader enhancement expenditure that underpins strong, long-term performance. And while we do not currently have a

[1] Prediction of Discolouration in Distribution Systems. A sustainable and cost effective approach developed by the University of Sheffield to manage drinking water quality using innovative hydraulic strategies. The approach supports water companies' understanding of how their water networks behave, helping to deliver improved resilience and customer service.

method to quantify this for AMP9 and beyond, our AMP8 business plan sets our requirements for the five years from 2025 to 2030.

2.3.4 Mains repairs

The weather is a material external influencing factor in terms of mains repairs performance, particularly when considering it over a short time frame. This is clear when examining performance in this area across the sector, as all water companies tend to move up and down to similar degrees year on year.

That said, the most direct impact over time is from base activity – primarily mains renewals, which we carry out to maintain asset health through a targeted mains replacement programme. New systems, improved data, maturing processes and modern materials mean that mains renewal can be better targeted over time, leading to fewer bursts, for example.

Enhancement activity in this area is dominated by new mains laid for growth purposes. In 2021/22, we laid almost 50 km of new mains across our Cambridge and South Staffs regions, which is around 0.6% of the total network length This will help to modernise our network over time and contribute to reducing the number of bursts on our networks. In addition, we use our leak detection activity to identify potential bursts, which also has a positive impact on our underlying asset base.

Looking to the future – maintaining long-term asset health

We are aware that our current mains renewal rate may not be sufficient to maintain asset health over the long term. We anticipate that we would need to have access to more funding to deliver a step change in main renewals and drive performance at a faster pace.

2.3.5 Unplanned outage

This was a new performance commitment at PR19 and succeeded Ofwat's previous serviceability assessment.

As with mains bursts, maintaining asset health is primarily driven from base expenditure, but has enhancement impacts. In the case of non-infrastructure assets, for example, there will be benefits arising from the construction of new assets to deliver improvements against other key drivers. The upgrade programmes at Hampton Loade and Seedy Mill are good examples of this.

Looking to the future – reducing levels of unplanned outage

Over the long term, we will continue to ensure that any enhancement expenditure in this area in combination with our base capital expenditure (capex) programmes will continue to drive improvements in performance over time and deliver improved asset reliability.

2.3.6 Biodiversity

Activity over the past ten years has been closely linked to our funded catchment management activity and delivery of our WINEP obligations. These are enhancement drivers. There is also an element of ongoing management of our existing schemes, which would be base expenditure, with each area of enhancement expenditure implicitly transferring to base at the end of each price control period.

Looking to the future – delivering biodiversity benefits

Over the long term, we will continue to evaluate opportunities for delivery of biodiversity improvements across our supply area and maintain the areas we have improved already.

For PR24, a new approach to assessing biodiversity has been adopted and we need to continue to assess our existing schemes and future schemes with this new framework, which we will continue with over the next 12-18 months.

Much of our current biodiversity programme is driven by the Water Industry National Environment Programme, which is currently not projected past AMP8. We will continue to evaluate our requirements for enhancement activity as any future requirements become apparent.

2.3.7 Operational greenhouse gas (GHG) emissions

Our view is that tackling GHG emissions is a mix of both base and enhancement activity.

Within base, we have activity that has consequential effects on our GHG emissions. For example our pump efficiency programme seeks to address routine deterioration of our pumping assets, which helps to make them more energy efficient and reduce our operational carbon emissions. In addition, we also consider energy efficiency factors for any capital maintenance scheme – to try and improve energy and carbon efficiency. We have also carried out reviews of our network to minimise energy use. And we are adopting new technology – including electric vehicles – as operational requirements allow.

Our enhancement programmes can also impact our GHG emissions. For example, by reducing leakage levels, we reduce the volume of water we need to pump and treat. We also consider energy efficiency and carbon emissions as part of our large capital upgrades. This includes our successful green recovery at Hampton Loade, where we looking to deliver carbon reductions alongside an enhancement-funded upgrade programme at the treatment works.

Looking to the future – reducing operational GHG emissions

Looking ahead, if the pace of carbon reduction emissions is to be increased, then this will likely require specific investments to reduce carbon, such as installing solar generation on our available land, rather than it being a consequential benefit of other schemes. This would represent a step change in activity for us, which would require dedicated expenditure allowances.

2.3.8 Leakage reductions

At PR14, we had a static leakage target and no enhancement funding. For PR19, we had a leakage reduction target but Ofwat policy at the time stated that this had to be met through base

expenditure and made no enhancement allowances. We have continued to invest to bring leakage levels down and are on track to deliver our ambitious targets of 15% across both our Cambridge and South Staffs regions.

Looking to the future – delivering long-term leakage reductions

As we continue to reduce leakage over time, we are likely to reach the point where it cost more to reduce leakage as the remaining leaks are harder to find and repair. We will look to mitigate this with new technologies and innovation. But we are mindful that this is something that may never be fully mitigated.

2.3.9 Household water use (PCC)

Over the past ten years, we have carried out a wide range of water efficiency activity, encouraging our customers to be more water wise and value it as a precious resource. This activity includes:

- supplying customers with water efficiency devices;
- offering educational resources and programmes;
- taking part in local and national water efficiency campaigns; and
- continuing with our longstanding programme to encourage more customers to choose to have water meters installed.

We have also improved our data systems and have implemented new models for capturing consumption data from both measured and unmeasured customers. And we have continued to make PCC a prominent feature of our water resources planning and optioneering.

The majority of these activities have been delivered through enhancement expenditure, but base expenditure has supported these enhancement programmes to some extent, for example including our day-to-day activities, running data models and maintaining the systems that support this expenditure.

The most significant impact we can have on PCC over the period covered by this long term direction statement is to roll out full metering to our customers, and continue delivering water efficiency campaigns, which is enhancement activity.
Looking to the future – delivering behavioural shifts to reduce household demand

The COVID-19 pandemic, for example, saw a significant shift in PCC across our Cambridge and South Staffs regions, which has not yet reverted to pre-pandemic levels. This means our PCC is currently significantly higher than our PR19 baseline. We have discussed how we will address this in our AMP8 business plan and will remain mindful of the impact circumstances outside of management control can have both on our plans and on our performance.

2.3.10 Non-household demand

We do not currently have a specific PC relating to non-household demand. However we realise this is a key area for us to drive down consumption as outlined in our WRMP.

Looking to the future – delivering tangible reductions in non-household demand

Going forward, we would expect non household demand reduction programmes to be classified as enhancement, as it is likely to be a material increase in activity within the supply/demand balance programme that has not previously featured in our historic costs. We describe our long-term plans for this area in more detail in our Cambridge and South Staffs WRMPs, and consider the medium term in our AMP8 business plan.

2.3.11 Serious pollution incidents and discharge consents

These are new performance commitments for PR24 for water only companies. Although we do not have PC targets to deliver in this area during the current AMP, over the past ten years our activity has focused on discharges from our water treatment works. This is because the chemicals we use at these sites pose a material risk to surrounding water bodies. We have put in place risk mitigation approaches – for example, by improving our chemicals storage and containment, enhanced monitoring of discharges (MCERTs) and managing our policies and procedures.

We have not experienced a significant problem with pollution incidents or discharge consent breaches and we have continued to work on reducing risk as part of our routine capital maintenance.

Looking to the future – minimising the risk of pollution incidents and discharge consent breaches

Going forward, we see the ongoing management of pollution incidents and discharge consents as base activity. But if a step change in performance was expected to deliver enhanced compliance levels or monitoring requirements, then we would consider this to require enhancement expenditure.

Part 3:
Strategy – how we will achieve our long-term ambition

3. Achieving our ambition

Our Long-term delivery strategy (LTDS) delivers our ambitions and targets by adopting a holistic and adaptive approach in developing our plans across all our key investment areas to form our adaptable core and alternative pathways that meet our customers' expectations of the services they want us to deliver, at the right time.

Our core adaptive pathway includes outputs from key strategic planning frameworks, best value and 'no/low regret' options that meet a range of plausible scenarios developed through various tools and investment models to determine the key activities required up to 2050.

Our LTDS sets out our strategy, and our PR24 business plan is an integral and essential foundation for that journey. Thus, our LTDS brings together strategies for each of our key investment areas with a clear line of sight from our AMP8 investment programme developed and set in the context of achieving our long-term outcomes.

We recognise long term adaptive plans will carry a high level of uncertainty with time and therefore have stated clear assumptions of what we understand today and what may change over time as new information becomes available. This includes assumptions of improvements in base expenditure to current regulatory drivers and standards without pre-empting new regulatory drivers or changes but recognising the need to ensure we have a strategy that is adaptable to future uncertainties.

In our core pathway each investment area has been developed and tested against Ofwat's common reference scenarios to understand the level of risk to delivering our strategy and long terms outcomes identified what additional investment is needed (and areas we need to monitor) due to changing circumstances. This assessment has helped shape and develop our alternative pathways to ensure we deliver our ambition and targets under all plausible scenarios. It has also helped develop our monitoring plan which allows us to objectively assess which of the potential futures will be realised by monitoring key activities/metrics that will indicate when we have reached a 'tipping point' or the need to adapt our plan to ensure we invest in the right options at the right time.

Our key investment areas as part of developing our core and alternative adaptive pathways for our LTDS, and the measures we have put in place to ensure we achieve our ambitions, are summarised below in table 4.

Table 4: summary of our key investment areas to achieve our LTDS ambition

Key investment areas	A summary of our approach and key activities to achieve our ambition
WRMP – Supply and demand (SDB)	Our WRMP investment strategy has been developed through a well-established process using best value and adaptive principles (as per guidance) and incorporating statutory targets and requirements to ensure we maintain the balance between supply and demand over the long term. The WRMP includes key demand and supply side enhancement activities that underpins our core pathway investment to ensure we achieve our long-term outcomes and ambitions, such as our demand reduction targets. The WRMP has been stress tested to meet the common reference scenarios. An alternative pathway was identified for the low technology scenario increasing investment for demand management due to slow roll out of metering assumes in the scenario.
Environment (WINEP)	Our WINEP programme includes key activities to support meeting our environmental ambition. This includes a series of investigations in AMP8 to help accurately determine the scale of the abstraction reductions required for delivery in our area. The WINEP also includes other actions to for example support the recovery and enhancement of Natural Environment and Rural Communities Act (NERC) Act and meet Eels Regulations. We also include activities to support chalk stream river restoration building from AMP7 investigations identifying several morphological measures to improve flows for the ecology until future abstraction reductions can be made.
Water quality	We have followed the principles of drinking water safety planning in developing our core and adaptive pathways and have used the main categories of catchment, treatment, distribution, and customers to quantify the investment needed to maintain the current regulatory standards, and then additional investment required to meet adverse scenarios (notably high climate change scenario). Thus, for surface water treatment an alternative investment pathway was identified to ensure we achieve our ambition of delivering wholesome potable water now and in the future.
Resilience	One of key building blocks in developing our investment pathway was developing a new resilience model for all our supply zones in our network. This was used to test and assess the core needs for network resilience (in terms of hours of storage available) into the future to meet our network resilience ambition. To achieve our unplanned outage ambition, we largely need to continue what we are doing, and maintain our assets appropriately assuming improvements in base expenditure. As such, we are forecasting limited enhancement expenditure based on our current knowledge. The other areas of enhancement at our production sites are covered in other areas eg water quality.
Lead	This is an area of investment that builds from our proposed AMP8 enhancement expenditure that secures lead compliance, focuses on key risk areas (eg schools) and enables activities that allows for supply pipe trials to evidence efficiencies and synergies to inform the future strategy for lead. In future AMPs we will increase our rate of lead replacements, increasing the rate in AMP10 that is three times our current rate of communication pipe replacement which had been partly informed by customer preferences to ensure we prioritise meeting our ambition for lead. This will see us invest circa £20m per AMP and our strategy adapted as we learn from trials in AMP8.
Net zero	Our long term delivery strategy in this area is focused on a phased, modular approach which balances and optimises efficiency (cash, kWh and carbon), affordability, technology evolution and innovation. The foundation and building blocks for the net zero (NZ) transition to 2050 is set out in AMP8 as we accelerate our plans for increasing low carbon and renewable energy and reducing our dependency on grid imports, while driving for greater resilience and protecting our stakeholders, including customers, from the uncertainty and potential shocks of a global energy market.
Cyber	For cyber security, we have considered the UK Government's Cyber Security Strategy 2022 – 2030, and current regulatory targets including the DWI CAF-SSP and DWI-ECAF targets. Our approach to enhancing cyber security over the LTDS period is based on continuous risk assessment to deliver a no/low regret plan. Cyber risk will be assessed based on current and emerging threats, and changes in government guidance and regulation. It's our ambition to maintain a low to very low risk profile over the LTDS period to ensure we mitigate future risk and continue to protect the essential service.
SEMD	All SEMD investment has been heavily scrutinised internally, via external audit and by the Drinking Water Inspectorate (DWI) to confirm the need for the spend. Given our investment has been relatively flat in recent AMPs we have projected this to continue throughout the period. Activities in our core pathway included are entirely to ensure compliance with the SEMD regulations and guidance, so is completely 'no regrets' as it directly delivers a regulatory need.

Making sure our investments are affordable

Affordability is an important area we have considered across all our investment areas. We propose to move forward by selecting no/low regrets options (informed by customer research) to ensure the decisions we take now and in the future minimises the impact to customers. As we want to make sure that our customers' water bills are affordable both now and, in the future, whilst we continue to work towards delivering our long-term ambition of eradicating water poverty.

This is why, as part of considering wider scenario testing, we have considered the impact affordability may have on our customers in the future and therefore have proposed to monitor the levels of water poverty as a key metric going forward. This is supported by our PR24 business plan proposals which includes a number of measures and enabling activities such as innovative tariff trials that will help support and inform our future affordability strategy. This is further described in the common reference scenario testing in this chapter.

How our customers have informed our LTDS strategy

Our wide-ranging research and insight into customers' long-term priorities and preferences has been a fundamental building block in developing and shaping our core and alternative adaptive pathways to achieve our long-term targets and ambitions.
Following the completion of our LTDS research in June 2023 (as described in chapter earlier), we then worked with our PR24 research and triangulation partners, Impact research (Impact), to develop a decision-making framework to evidence that our LTDS ambition and strategy reflects customers' priorities. The key focus when developing this framework was on gaining a robust view of how customers wanted us to "phase investments" to deliver on their priorities. Specifically, when should investments be made across the 10 ambition areas tested in the research to unlock the benefits for customers and the environment.

To enable this, we worked collaboratively with Impact to assess all the sources of insight that could be reliably triangulated. This included the core LTDS study, a range of PR24 customer valuation research studies, customer priorities tracking and wider relevant insights from our Water Resources Management Plan research. The approach for developing this framework is detailed in our "LTDS Triangulation" report (appendix: 'SSC33 Impact – SSC LTDS triangulation report'). We also engaged an academic peer reviewer, Professor Iain Fraser, also the peer reviewer for our PR24 WTP triangulation approach. This provided valuable independent input and he gave the following feedback on the original proposal (see the report for full details).

- The RAG weighting by data source was a good approach, as it allows us to always examine how a change in RAG weighting for any one data source impacts on the overall view of the data.
- However, the standardisation methodology was not at all clear. It attempted to combine closed scale data, real number line data (+/- infinity), percentages etc, all values that have very different meanings that required subjective assumptions about the properties of these scales.
- It was also unclear how we would calculate true confidence intervals for each data point.

After further discussion, it was agreed that an approach similar in principle to the RAG ratings used in the PR24 WTP triangulation should be used to also represent the priorities indicated by each insight source. This would also further aid the consistency of the approach across all SSC's triangulation. The priority weightings are therefore all based on expert user interpretations of the sources. While this use of ratings is clearly a subjective process, it has the advantage of being transparent and a practical way of combining very different data types into a common evaluation framework. This allowed sensitivity testing to also be undertaken to assess the impact of changing the weighting of different data sources.

We view the ability to conduct sensitivity testing as vital given the challenge of combining diverse / heterogeneous data types and the subjectivity inherent in the application of user-defined weightings. The framework has been developed by Impact to offer practical value as a means of drawing together diverse information in a common format, but we have made sure that its limitations are recognised and understood. The value of the tool is in assessing what changes in RAG weightings ratings might be needed to observe if the outputs match expectations or not. In addition, when using the framework, we have weighed the outputs from the model against our wider understanding of delivering our ambitions.

An example of this relates to removal of lead pipes, where the lack of a strong direct measure in our other studies required us to link lead pipes to water quality when using the customer priorities tracking priority index data. This inevitably leads to a strong value for this issue, despite other sources, showing that it is of relatively lesser importance. Given this, the decision was made to 'downgrade' the value of this attribute to the lower end of its value range, as this was considered a fairer reflection of the actual value attached to lead pipes when customers are giving their preferences for investment.

The level of sensitivity around the 10 ambitions was also tested in our LTDS customer research when considering the priority score over the AMP periods to 2050. This chart covers only the views of household customers, given we do not have robust enough samples for NHH and future customers to be able to replicate this view amongst these segments. However, we have analysed the data and found that:

- All future customers want delivery of the water quality ambition target by 2040 and, as a segment, place more emphasis on achieving net zero carbon, prioritising it second only to improving water quality. Future customers also want faster progress to ensure we offer more proactive customer service and all wanted lead pipes replaced by 2040, even if they attached less priority weighting to this ambition compared to household customers.
- Non-household customers, like future customers view delivering abstraction reductions to protect the environment (WINEP) as less urgent to achieve than household customers; and
- Non-household customers attached more priority weighting (ranked third highest) to deliver net zero ambitions, but were slightly less likely to say they wanted it to be delivered earlier than household customers.

For more information on the variability in the score ranges around the average customer values from our LTDS decision making framework for household customers can be found in appendix 'SSC07 Customer engagement strategy and key insights'.

This approach has provided us with a robust decision-making framework for assessing how customers would prefer investments to be phased to 2050 to deliver ambitions in our LTDS. A summary of how we have used this insight to inform our LTD strategy is summarised in table 5 below. The customer priority score provides a view on the priority levels customers are placing on each ambition area during each Asset Management Period between 2030 and 2050. The ambitions are ordered high- to-low based on their priority score up to 2050. This approach has helped us to better understand when customers want us to prioritise investments to unlock the benefits these will deliver.

Table 5: LTDS Customer research informing LTDS strategy

Ambition areas	Customer priority scores (%)					How insight has informed our LTDS Strategy
	2030	2035	2040	2045	2050+	
Improving water quality	17%	14%	24%	17%	22%	The consistent strength of the customer priority score validates and supports a strategy of investing to ensure targets are not missed, but a continued and consistent effort to maintain and improve. This supports the need for resilience and WQ driven investments which is included in our core pathway and alternative pathway under high climate change scenario to ensure water quality is not compromised.
Tackling water poverty	24%	24%	3%	19%	6%	The customer priority profile validates the need to do more in the short terms given the challenges of affordability, cost of living increases and the anticipated rise in water poverty. The insight supports and builds from our AMP8 Retail plan initiatives from tariffs trials to widening the contribution support for our social tariff. We have also commissioned studies to better understand our water poverty status and future projections to ensure we have mitigations in place to support customers.
Leakage reduction	16%	14%	17%	12%	11%	The customer priority profile validates the need to pull forward investment to go faster to reduce leakage, and so we have increased investment in AMP8 for both regions following customer and stakeholder feedback. The key insight here is to "not take foot of the gas" but consistently strive to deliver leakage targets by 2050 if not earlier.
Reducing supply interruptions	8%	7%	11%	10%	23%	The customer priority profile validates the approach we have taken to forecast the performance commitment which builds from the PR19 forecast and historic track record improvement and maintaining an Upper Quartile position taking a marginal returns approach that is credible and supported by customers.
Drought resilience	17%	22%	5%	1%	0%	The customer priority profile validates and supports our WRMP investment to achieve drought resilient to 1 in 500 before or by 2040 particularly for our Cambridge region as supply options in come online.
WINEP	6%	5%	11%	6%	11%	The customer priority profile supports our WINEP programme in reducing abstractions in AMP8 and further reductions post AMP9 when requirements are known following investigations.
Reducing how much water we use at home and at work	2%	3%	9%	14%	6%	The customer priority profile supports our ambition in achieving national targets by 2050 as set out it the Environment Act. However, the insight also shows customers view PCC as a lesser priority in the short term which indicates the need to do more in raising awareness, engaging and supporting our customers to better show the impact of water consumption to security of supply. Our strategy will set out key building blocks in AMP8/9 including Government initiatives so we can see notable drop in PCC by 2040 and ensure we are on track to meet the target of 110 l/h/d by 2050, as well as reducing NHH demand by 15% by 2050.
Lead pipe removal	6%	5%	9%	5%	7%	The customer priority profile supports us in changing our lead strategy to do more sooner. We will do this by increasing our spend from 2035-2040 as we build our understanding in AMP8/9 to ensure its more cost effective and affordable in future. This considers affordability challenges and allows for a smoother long term bill profile (key finding from our intergenerational fairness research), it was also highlighted in our willingness to pay research where lead replacement did not attract significant valuations for AMP8 in our South Staffs region.
Achieving net zero carbon	2%	3%	6%	10%	10%	The customer priority profile validates our long-term net zero strategy to achieve net zero embedded carbon target by 2050 which is aligns to the water government target.
Offering smarter customer service	3%	3%	5%	8%	4%	Although a lower score relative to other ambition areas, this is still a key ambition area customer expects to see delivered on as technology/services develop - this insight will support the retail plan in delivering improved services from smarter networks and accessible and proactive services which enables meeting other ambitions, such as supporting PCC initiatives.

4. Outputs from the strategic planning frameworks

Our LTDS is underpinned and closely aligned with achieving outputs from key strategic planning frameworks. This includes our Water Resources Management Plan (WRMP) supported by regional water resources planning frameworks which are well established processes developed in compliance with the Water Resources Planning Guidance (WRPG) set by the Environment Agency. It also contains statutory and environmental requirements and water sector commitments, as well as government priorities and targets such as those set out in Defra's Strategic policy statements and the Environment Act targets.

The key strategic planning frameworks and outputs we have incorporated which make up a significant part of our LTDS core pathway investment of which some of the key ones are described below.

WRMP

Every water company in England and Wales must produce a Water Resources Management Plan every 5 years. The plan looks at the predictions for water demand over the next 25 years, and what water supply is available to meet this demand. It then details how the water company will ensure it meets this demand through a potential range of demand management and new supply options.

Our last plan was produced in 2019 and a lot has changed since then. Much of the change relates to climate change and its impact on future water availability, both for public water supply and for environmental needs. In 2021, the South Staffs Water was declared as an area of serious water stress by the Environment Agency.

Even as we have been developing this plan, in 2022 our supply region is currently classified as being in drought, and the need to ensure our supplies are resilient to future periods of long dry weather is apparent. This WRMP looks to ensure a step change in drought resilience as we have undertaken studies to identify the actions required to make our system resilient to a 1 in 500-year drought, where the previous requirement was a 1 in 200 year drought In reality, this means that the chance of an extreme drought reduces from 0.5% to 0.2% in any given year.

In addition, the population is our regions is growing, and this is demonstrated with startling clarity in our Cambridge region which is forecast to have the highest rate of population growth in the UK over the next 15 years. This growth relates to both household and non-household populations, as the city looks to become the science capital of Europe and homes are developed to meet the current housing shortage and support the increase in employment in the area.

The Covid-19 pandemic saw our customers use over 20 litres per person per day more than they did prior. This is due to more people working from home more often and increased hygiene practices. Even now, we are seeing this increase has not returned to pre-pandemic levels, nor has it been offset by a reduction in non-household usage. This means that demand for water has increased since WRMP19 and is set to increase across the lifetime of our plan.

A key focus of our WRMPs is to ensure that we meet not only the water needs of our customers, but also that of our environment. Our plans will ensure that abstraction reductions are delivered over the next 25 years from our existing sources in order to counteract the impacts of climate change and ensure the environment has the water it needs. This will also ensure delivery of the Water Framework Directive (WFD) targets.

Whilst the threat of climate change is not a new challenge, our understanding of it and the risk it poses to public water supply and the environment has evolved since our last WRMP in 2019. It is clear that our old method of developing WRMPs, where individual water companies prepare their own and focus only on their own requirements, will not solve the wider water issue in England.

This has led to the development of regional water resources planning groups across England. There are five groups, and South Staffs Water is part of Water Resources West with Cambridge Water part of Water Resources East. The five regional plans have been overlaid to create a national picture, which ensures that the best value plan, for both customers and the environment, to meet the water needs of the country has been developed.

Our key outputs and objectives for our WRMP plans are to:

- Deliver a sustainable and resilient supply of water for both our household and non-household customers now and in the future.
- Commit to reducing the amount of water we abstract from the environment over the lifetime of the plan in order to protect and enhance the natural environment in which we operate.
- Identify the longer-term uncertainties e.g. climate change, and, if required, provide adaptive pathways within the plan in order to ensure we can respond to future challenges.
- Be acceptable and affordable for our customers.

We also develop our plan in alignment with Ofwat's public value principles.

For our South Staffs region, which is already resilient to a 1 in 500 year drought event, the main focus of the plan is to deliver the necessary abstraction reductions to ensure environmental protection now and in the future, as well as driving ambitious demand reduction programmes that align with the government's Environment Act targets published in 2022:

- Reduce the use of public water supply in England per head of population by 20% from the 2019 to 2020 baseline reporting figures, by 31 March 2038, with interim targets of 9% by 31 March 2027 and 14% by 31 March 2032.
- Reduce leakage by 50% by 2050, with interim targets to reduce leakage by 20% by 31 March 2027 and 30% by 31 March 2032.
- Reduce non-household water demand by 9% by 2037 and 15% by 2050.

WINEP - Environmental requirements

Every five years, companies develop their Water Industry National Environment Programme. This plan outlines the environmental activities a company proposes to make during the next AMP period to enable and deliver environmental benefits in the region.

WINEP programmes are developed in line with the guidance issued by the Environment Agency and activities relate to statutory and non-statutory drivers. Our plans have been developed with input and ongoing liaison with the Environment Agency.

- Our plan for AMP8 is our most ambitious yet and builds on the investigations we have undertaken as part of the AMP7 WINEP programme as we look to take forward options identified to implementation. Our plan also looks at supporting key areas such as delivering biodiversity improvements, supporting the removal of invasive species such as mink, the protection of species and river restoration work. There are some investigations, primarily to determine the environmental destination abstraction reductions required in the long term.

Previously, our catchment management programme has formed a large part of our WINEP programme. For AMP8, this work now moves into our business-as-usual activity and will be included in our PR24 business plan. We propose to continue our efforts in our region to deliver improvements to groundwater quality at source. Our Spring programme, working with local farmers and landowners, has seen significant success in reducing nitrates and metaldehyde, and we plan to expand both the area we cover with this scheme, and also the range of pollutants we tackle. This will help deliver improved raw water quality which will ensure we are able to maximise our existing raw water resources

Our core pathway describes the key areas of our AMP8 WINEP programme and how this will help enable and inform activities beyond AMP8 and into the future to meet our environmental ambition.

Drinking Water Safety Plans (DWSP)

A continuous supply of safe clean drinking water is vital to maintain public health, and ensuring the quality of that drinking water is fundamental to the service we provide our customers. To do this we use a risk management approach and have developed Drinking Water Safety Plans (DWSPs). Not only is this the right thing to do every water company also has a regulatory requirement to produce them, covering our source to tap risks. We have used this framework to support our analysis for our LTDS, by breaking down our long terms plans into;

- Catchment – those activities upstream of water sources where land management activities can influence the quality of raw water
- Treatment – our ground and surface water works that treat the raw water to make it safe to drink
- Distribution – the assets the move the treated drinking water around our network to our customers
- Customer - our customers can have a direct influence on our water quality due to their internal plumbing
- We have ensured that our core pathway meets the current water quality regulatory requirements.

5. Our core pathway

Our core pathway overview

Our core pathway delivers our ambitions and strategy by taking a holistic approach to long term planning. It brings together outputs from strategic planning frameworks and customer views on long term priorities and preferences on investment phasing to develop strategies for each of our key investment areas. Our strategy adopts adaptive planning principles as it recognises the need to adapt to future uncertainties and plausible scenarios. Our core pathway therefore includes no/low regret investments and activities to enable timely decisions to minimise the cost and impact of future trigger points on our customers and the environment.

Our core pathway includes:

- Our AMP8 enhancement programme – that delivers our no/low regrets best value plan;
- Alignment with our WRMP investment profile – to ensure we meet statutory targets and environmental requirements.
- Key investment areas developed in the context of the long-term and built from our forecast of performance improvements assumed through base expenditure to ensure we meet and deliver our long term outcomes.
- Adaptive principles which show the key activities we will monitor and the ability to adapt to certain circumstances whilst ensuring no/low regrets interventions or feasibility activities are included to meet plausible futures. This enables us to make decisions at the right time that minimises the cost of future options (Our example case study on developing our metering strategy is a good example of this and is described in the rationale chapter)

Our overall core pathway investment profile up to 2050 is summarised in the table 6 below setting out the key investment areas starting from our PR24 business plan investment for the first five years to key activities that will likely be required given a range of plausible circumstances. This includes investment in long-term resilience schemes, net zero and lead programmes to meet long-term outcomes; and although not included in the table assumes base expenditure improvements from new tech processes and efficiencies.

Table 6 – our core pathway investment areas as aligned with Table LS3

Key Investment Areas	Totex spend per AMP (£, Million)					Key Enhancement Activities / Schemes
	AMP8	AMP9	AMP10	AMP11	AMP12	
WRMP (SDB)	65.288	105.53	35.2	24.3	15.1	Includes our supply and demand side schemes such as leakage and full roll out of universal metering over AMP8 and AMP9. From AMP9 onwards we start to enable supply side options this include building a new water treatment works on the river Cam for operation in AMP10 (Note costs related to Fens and DPC schemes excluded as per guidance).
Environment (WINEP)	19.892	7.5	7.5	7.5	7.5	Contains key activities to support our environmental requirements and investigations identified through WINEP in AMP8 to help define future requirements. Currently assumes further Biodiversity activities as no/low regrets in future AMPs. We also include activities to support chalk stream river restoration and measures to improve flows until future abstraction reductions known.
Water quality	28.1	23.2	52.2	41.2	26.2	Key activities and investment captured under the four DWSP areas catchment, treatment, distribution, and customers required to maintain the current regulatory standards and links to resilience investment (Network calming in AMP8).
Resilience	19.2	16.6	3.0	0.0	0.0	Includes a number of key enhancement activities for network resilience to ensure we meet minimum no regrets storage targets (12 hours) and to support us in meeting our long-term PCs.
Lead	7.2	13.0	19.8	19.8	19.8	Our investment builds from our proposed AMP8 spend that secures lead compliance, focuses on key risk areas (eg schools) and enables trials that look for synergies and efficiencies to inform the future strategy for lead. Thus, we increase our rate of lead replacements from AMP10 (three times our current rate) which was also informed by customers' preferences on priorities for lead ambition.
Net zero	7.2	9.0	11.0	13.0	14.0	The key building blocks for the net zero (NZ) transition to 2050 is clearly set out in our strategy but a key area of enhancement spend will be our plans for increasing low carbon and renewable energy and reducing our dependency on grid imports (includes PV and nature-based solutions).
Cyber	2.7	4.0	4.0	4.0	4.0	Key activities build from meeting current regulatory targets (eg the DWI CAF-SSP and DWI-ECAF targets) and spend allows for continuous risk assessment and mitigating emerging threats, and changes over time to deliver a no/low regret activities.
SEMD	0.52	0.5	0.5	0.5	0.5	Given our investment has been relatively flat in recent AMPs we have projected this to continue throughout the period as entirely 'no regrets' to ensure compliance with the SEMD regulations.
Total Core Pathway (£M)	150.1	179.33	133.2	110.3	87.1	

For some investment areas the table shows a no/low regrets investment run rate for each AMP recognising the high levels of future uncertainty and improvements in base expenditure assumed. Our AMP8 investment activities and monitoring plan will be a key enabler to develop and adapt our future core pathway as certainty increases and more information comes to light, from which we will be able to adapt our plan efficiently.

The notable step up in investment from AMP9 and AMP10 is due to enabling works and bringing online new supply side options into our Cambridge region. This include a new surface water treatment works on the River Cam and Fens reservoir which is delivers no regrets solution for ensuring environmentally sustainable economic growth in Cambridge. However, we recognise the cost uncertainty in delivering Fens reservoir and the impact on customer bills and financial resilience. Therefore, we need to be certain on the levels of investment needed, and clarity on regulatory approach. We further explore this challenge in appendix: 'SSC03 Fens Res – our approach into AMP8'.

Below we provide a summary of the strategy of each of our key investment areas including the main enhancement activities proposed with the methodology and the process followed to develop core and alternative pathways are described in the rationale chapter and key underlying assumptions covered in the foundations chapter in this document)

5.1 WRMP – SDB strategy

Our core pathway closely aligns with our WRMP investment requirements to meet our long-term ambitions.

For our Cambridge region, our plan looks to balance the apparently conflicting needs to both our customers and the environment. Over the next 15 to 20 years, we need to reduce abstraction from our existing chalk aquifer sources by circa 60 Ml/d – this is against a current daily supply of circa 85 Ml/d. Whilst we clearly have a reduction in supply availability, we also have a significant growth in demand forecast, with our baseline non-household forecast showing a demand increase of 55% by 2038 from the 2020 position. Some projections even suggest up to 250,000 news home could be built in the region by 2040 – this would more than double the size of Cambridge which currently has circa 140,000 homes. This significant uplift in demand coupled with the large reduction in available supply has led to a long term plan that utilises demand management to offset the increase in demand due to growth, and with new supply side options proposed to enable the delivery of the abstraction reductions and meet the environmental need.

The supply side options rely largely on bringing water in from outside the Cambridge Water area, as we are unique in our geology leading to all of current abstractions being from chalk aquifers which means there are very few options within our area that are environmentally viable. Our plan of key supply schemes and timing is shown in table 7 below.

Table 7: Cambridge WRMP supply side schemes in core pathway

Scheme	Core Pathway	Detail
Grafham Transfer	AMP 8 - £12.457m	Transfer of 26 Ml/s from Anglian Water's Grafham Reservoir in 2032 upon completion of the Grand Union Canal and Minworth strategic resources options (SROs). These enable Affinity Water to reduce its current transfer from Grafham Water, thus freeing up water to transfer to Cambridge Water
Fens Reservoir	AMP 8 - £70.6m AMP 9 & 10 - £980m	The Fens Reservoir, developed jointly between Cambridge Water and Anglian Water (AWS) will supply 44 Ml/d to the Cambridge region upon completion in 2036. (costs represent those for Cambridge Water only, based on an assumed 50:50 split with AWS.
Fenstanton borehole	AMP10 - £4.46m	Re-comissioning of Fenstanton borehole for additional 2 Ml/d in 2040
Milton water recycling	AMP10 - £237.38m	Milton water recycling centre reuse scheme for 7 Ml/d in 2040 -

The baseline conditions for the WRMPs are outlined in the water resource planning guidelines and they have been developed in accordance with this guidance for our plans. Key elements includes supply forecast, abstraction reductions required and any changes to water availability, headroom, outage, demand forecasts based on published local plan growth profiles.

For our South Staffs region, our plan is led by demand side options as it is in our Cambridge region, except there is no need for any new supply options to deliver the Environment Act targets. The key demand side schemes are shown in table 8 below.

Table 8: Our WRMP demand side schemes and benefit in both regions

Demand side activity	Cambridge Total benefit by 2050 Ml/d	South Staffs Total benefit by 2050 Ml/d
Water labelling no minimum standards	4.7	20.40
Universal Metering	1.42	12.45
PCC 110 l/h/d by 2050 (excl WL & metering)	2.33	1.32
50% Leakage reduction by 2050	5.9	22.70
Non-household consumption reduction	4.04	10.48
Total benefits (Ml/d)	67.35	71.39

Our overall WRMP AMP8 and total cost of the plan and associated Ml/d benefits is summarised in Table 9 below:

Table 9: Ml/d benefits of WRMP AMP8 Plan

Region	AMP8	Total WRMP24
Cambridge	£22.1m (Benefits delivered of 6.36 Ml*)	£1,739.7m (Benefits delivered of 97.39 Ml)
South Staffs	42.32 (Benefits delivered of 19.54 Ml)	113.84 (Benefits delivered of 63.71 Ml)

*This benefit does not include the Grafham Transfer as this will deliver supply benefits in AMP9. If the Grafham Transfer benefits were included, unit cost would be £0.68m per Ml.

Our WRMP option development process and methodologies used is described in the rationale chapter. Further detail on WRMP programme and individual schemes can be found in our appendix: 'SSC34 South Staffs Water revised draft WRMP24 and SSC35 Cambridge Water revised Draft WRMP24'

5.2 Environment (WINEP) strategy

Our environmental requirements and investigation identified through WINEP will be a key building block in AMP8 to help optimise and deliver the key interventions needed across time to deliver our environmental ambitions and long-term outcomes.

Environmental Destination programme

The National Framework provides an early assessment of how much we may need to reduce abstraction by in order to meet future environmental needs and goals. There is uncertainty in the exact volume changes required, as well as the most effective solutions. It is possible that for some of the catchments, the abstraction reductions shown above will not be sufficient, yet in others it may lead to increased flood risk.

Further work is required in AMP8 to accurately determine the scale of the abstraction reductions required in our area. We are proposing to undertake a series of investigations through our WINEP programme which will confirm the scale of the reductions required, the locations, and a priority and timescale for delivery. These investigations will also look at the historic environment and

any risk and benefits associated with the abstraction reductions required. We will work with Severn Trent Water on these investigations where appropriate as we share catchments. The outputs of these investigations with inform our WRMP29.

There are also non-public water supply abstractions in our catchments and Water Resources West (WRW) has undertaken an initial evaluation of the scale and sectors across the WRW region. Changes to these licences are also expected to be required in order to achieve the environmental goals. We will need to factor this into our investigation process during AMP8.

In our AMP8 WINEP programme we are also including measures identified through some catchment prioritisation work undertaken through the regional planning groups, to ensure we're making environmental improvements prior to the full range of abstraction reductions being implemented.

Following the prioritisation, we have undertaken detailed work with local stakeholders to develop a first iteration of a water resource focused catchment plan which prioritises multiple benefits. We are proposing to work with stakeholders to deliver some of the short- and medium-term measures identified through our WINEP programme.

These measures include local flow support or enhancement measures (e.g., augmentations) and river restoration (e.g., removal of barriers and modifications, fish pass schemes)

After AMP8, our WINEP programme to 2050 will look to deliver the abstraction reductions identified through these investigations, including any additional catchment measures required to support this delivery. These options will be delivered once the investigations are completed and will be phased from 2030 to 2050.

The costs for this work have been developed regionally through engagement with our current framework suppliers for this type of activity.

Eel screens

The Eels (England and Wales) Regulations 2009, specifically Part 4 Regulation 17 of the regulations, makes it a legal requirement for any diversion structure capable of abstracting at least 20 cubic metres of water per day to install an eel screen. We undertook investigations in AMP7 relating to the presence of eels at Chelmarsh reservoir (which supplies water to Hampton Loade treatment works) and these were located during this work. As a result, there is a need to take action in AMP8 to fit an eel screen in order to fulfil our obligations under The Eels (England and Wales) Regulations 2009. This work will be completed in AMP8 and there is no future eel work foreseen. The cost has been derived based on similar eel screens we have already installed as part of the WINEP programme in AMP7. The preferred option ensures that eels cannot be entrained at Hampton Loade Treatment Works. This is considered the best value option in the absence of other viable alternatives to stop the entrainment of European eels at the treatment works.

Protected sites investigations

Investigations in AMP8 will define future actions or implementation measures that contribute to meeting and or maintaining conservation objectives of Habitats sites and that contribute to maintaining favourable conditions for Sites of Special Scientific Interest which are dependent on a healthy waterbody regime. These activities will be ongoing through future AMP periods. Investigations will be guided by Natural England and Environment Agency requirements.

Water resources

We are required to undertake investigations in our supply regions to allow us to evidence in taking more water from the environment in periods of dry weather. The WINEP therefore includes investigations in both catchments consisting of flow monitoring and desk study investigations and modelling to assess requirements for their use in the future. The recommendations from these investigations will be implemented in future AMPs.

INNS, NERC, Biodiversity Implementation

The WINEP includes actions that will support recovery and enhancement of Natural Environment and Rural Communities Act (NERC) Act S.41 priority species and habitats, and that prevent habitat deterioration by reducing the risk of spreading Invasive Non Native Species (INNS) and reducing the impact of INNS. These actions were identified from investigations undertaken in AMP7 as part of the WINEP scheme, and the options were scoped, costed and assessed accordingly to determine the actions to be delivered in AMP8. As we will be undertaking additional surveys in these areas in AMP8 too, this work will continue beyond AMP8 as we look to continue building on and sustaining the work undertaken to date.

Wales National Environnent Programme (NEP)

South Staffs Water's largest abstraction comes from the River Severn. This abstraction is subject to River Severn Regulation which, managed by the Environment Agency, looks to control flows in the Severn during times of low rainfall and reduced flow to ensure protection of the river. During these times, there are limitations and restrictions applied to our licence and we work closely with the Environment Agency and other abstractors on the River Severn to ensure that flows are balanced during these times.

Our River Severn abstraction takes place at our Hampton Loade treatment works. This is a facility that we share with Severn Trent – we operate and maintain the site on behalf of both parties, and Severn Trent are entitled to a third of the water produced by the site and so are responsible for a third of the costs and capital investment.

When the River Severn is experiencing low flows, the Environment Agency can utilise Clywedog reservoir by making releases from here to top up the level in the River Severn. Clywedog Reservoir is in Wales yet operated by Severn Trent Water. These releases from Clywedog means that South Staffs Water is able to continue abstraction from the Severn, and it is this relationship to the reservoir that means we also have a duty and responsibility to ensure the impacts of this impounding reservoir are mitigated on the local ecology.

Natural Resources Wales have undertaken studies that show that downstream ecosystems suffer as the result of impounding flows. As such, they have requested work be undertaken downstream of Clywedog to repair some of the damage caused by the impounding. The have requested South Staffs Water, and Severn Trent Water, undertake some gravel remediation works in AMP8 to mitigate some of this impact. As this is work in Wales under Natural Resource Wales, it does not fall under our WINEP programme, but instead under the National Environment Programme (NEP) that Wales operates. Following discussions with NRW, we are proposing to work with Severn Trent Water, on a cost share basis proportional to the benefit received by each company from Clywedog, in order to undertake gravel remediation. The cost of this work to South Staffs Water is £128,800.

Natural Resources Wales are planning to propose additional activities in AMP9 as work continues to protect and restore the downstream watercourse following further investigations. The activities required and cost have been provided by NRW.

Chalk stream river restoration

Following AMP7 investigations into river restoration measures to protect and enhance brown trout habitat we have identified several morphological measures to improve flows for the ecology until future abstraction reductions can be made. The investigations involved river surveys on prioritised waterbodies. These are Mill River, River Mel, River Shep, Hoffer Brook, River Granta, Vicars Brook & Cherry Hinton Brook. This work aligns to the WINEP Statutory NERC driver. The measures identified include:

- Channel realignment
- In-channel improvements – berms
- Bank reprofiling
- Removal of hard bank protection
- Deflectors and woody material
- Gravel augmentation
- Fish passage options at weirs
- Scrapes and ponds
- Buffer strips

Using a simple scoring assessment based on an options appraisal matrix evaluation, each option was ranked using scores from high to low (high scores indicating best performance based on selected criteria). Selected criteria included likely costs of and benefits to:

- Ecology – brown trout habitat
- Hydrology – flow processes and flood risk
- Geomorphology – channel morphology, long term sustainability of underlying processes and erosion/stability risk
- WFD status
- Social opportunities – aesthetics and recreation and community access and educational opportunities
- Economics and logistics – cost. fundability, buildability and maintenance requirements
- Value for money.

Overarching categories also included value for money, environmental sustainability, risk and status of WFD water body.

Cost estimates have been taken from the Environment Agency (2019) costs of restoration methods being based on costs produced and applied to the length/area identified in restoration plans. The restoration work will continue into AMP9 through a programme of work already developed, and it is likely to expand further through future AMPs in order to deliver the Water Framework Directive objectives.

The WINEP programme for AMP8 was submitted to the Environment Agency in November 2022 and their final approval of the work included in PR24 was given in May 2023 following review. The WINEP programme performance is monitored annually through the Environment Agency for all work in England, and Natural Resources Wales for all activity in Wales. As part of this, we must demonstrate our completion of the activity outlines and delivery of the specified outcomes in order for the Environment Agency to approve completion of schemes. Many elements of our WINEP programme contribute to the Biodiversity Performance Commitment.

We have identified the potential impact on the future delivery of the programme by testing the key areas against the Ofwat common reference scenarios and identifying a level of risk associated with these. This is described in common reference scenarios in the rationale chapter.

5.3 Water quality strategy

Ensuring we always have high quality drinking water for our customers is our top priority, and this is why it is specifically referenced in our ambition statements. Water quality is also the top priority for our customers and is consistently referenced in all of our of customer engagement as a hygiene factor that we must ensure we continue delivering.

Our long-term strategy sets out to ensure we have the appropriate investment in place to do this now and into the future, while being resilient to shocks and stresses. We are also very mindful of customer affordability. There are a number of strategic issues the sector is facing, water resources, resilience and environmental protection and improvements to name just a few that we are working through. Therefore, we welcome Ofwat's approach to adaptive planning, this allows us to plan for the future, being cognisant of uncertainty, by developing a number of investment pathways. By having a core "no regrets" investment plan, accompanied by a detailed monitoring framework enables us to develop adaptive plans. Due to monitoring of key leading indicators, we are able to adapt our plans in time to still deliver on long term strategy.

In England and Wales we are fortunate to have a comprehensive set of regulations, that from a water quality perspective are governed by the DWI. Continuing to achieve the drinking water quality standards as the anchor for our long-term planning. We have followed the guidance provided by Ofwat in developing these plans and have excluded anticipating regulatory change from this analysis. In addition, we welcome the importance Ofwat places on indicators such as the compliance risk index (CRI) and acceptability of water to customers (AoWtC). These are key measures for our customers to be able to have trust in us as a water provider. We have forecasted the performance that the investment in our long-term core pathway delivers (as per table LS3) across the whole planning period.

We have followed the principles of drinking water safety planning in developing our core and adaptive pathways covering the categories of catchment, treatment, distribution and customer. We use these categories to quantify the investment needed to maintain the current regulatory standards, and then if that investment is sufficient to withstand the shocks and stresses presented through applying the common reference scenarios.

A breakdown of the key enhancement activities included in the core pathway under each DWSP area across the AMP periods up to 2050 is summarised in table 10 below.

Table 10: Water quality key enhancement activities in core pathway

Area	Key activities in our core pathway	Expenditure (£M)
Catchment	**AMP8:** activity is actually categorised as base opex, however we believe as we progress through the planning period there will be a case for additional enhancement expenditure	0
	AMP9: Review appropriateness of an increased land holding strategy to allow more direct catchment management, holistic catchment run off strategy – increased rainfall intensity events, collaborative whole carbon capture project	0
	AMP10: Rethink of natural capital for nature-based solutions, Landscape scale restoration – whole catchment, collaborative Fens catchment management	12
	AMP11: Catchment rewilding strategy, Species reintroduction, Wider societal benefits of catchment management	15
	AMP12: Catchment wide multisector integration of healthier water catchments Being a beacon for the provision of greater good	3
Treatment (ground water)	**AMP8:** 1 Nitrate treatment process, 1 Manganese treatment process, 1 Antinomy treatment process	27.8
	AMP9: 1 Nitrate treatment process / 1 treatment process	10.7
	AMP10 /11/12: 1 Nitrate treatment process / 1 PFAS treatment process	10.7 (per AMP)
Treatment (surface water)	**AMP8:** Optimisation of new (AMP7 installs) at HLTW & SMTW. Enhanced performance monitoring	No enhancement ££ required
	AMP9: Understand and plan mitigation for bringing surface water into our groundwater only Cambridge region	3
	AMP10 /11: Process treatments to safeguard AoWtC **AMP12:** No expenditure planned that would pass our no-regrets assessment	15 per AMP
Distribution	**AMP8:** Network Calming phase 1 (spend captured under resilience)	0
	AMP9: Network Calming phase 2. Storage reservoir – quality optimisation	9
	AMP10: Network Calming phase 3. Service Reservoir – quality enhancement. Water Quality driven rehab	5 9
	AMP11/12: Water Quality driven rehab	15 per AMP
Customer	**AMP8:** Ongoing Water Fittings Regulations enforcement programme	0.3
	AMP9/10/11/12: Additional enhanced Water Fittings Regulations programme – responding to greater risk from potable / grey / black water systems (as low regrets)	0.5

The methodologies used in developing these key activities in our core pathway is described in the rationale chapter.

5.4 Resilience Strategy

At PR19, we committed to being resilient 'in the round' when delivering services for our customers. This means that we will have financial resilience, corporate resilience and operational resilience. We have updated our Resilience framework for PR24, which can be found as an appendix to our main business plan document appendix: 'SSC05 Integrated resilience framework'. Achieving our customers' desired level of resilience has been central to our business planning process, including the long-term delivery strategy.

We have carried out our most extensive customer engagement programme ever to ensure our PR24 and WRMP24 plans are underpinned by robust customer and wider stakeholder preferences. Specifically related to resilience, we see a clear thread from our engagement that customers (household and non-household) and stakeholders expect to see investment to ensure a reliable high-quality, affordable service is maintained 24/7. Customers also expect further investment in infrastructure schemes to detect and predict problems and to quickly fix and prevent any failures before their impacts are experienced. A "reliable, high-quality supply"

continues to be the number one priority for investment among our customers – as evidenced in our Customer Priorities Tracker, which is a qualitative and quantitative study that has been running since 2020 and achieving our ambition how customers informed our LTDS.

Our resilience plan covers everything from securing long-term water resources in our water stressed areas, to ensuring we can deliver this water to customers within each of our supply zones without interruption. Every investment we have made in AMP7, and propose to make in AMP8 & beyond, maintains or improves our levels of resilience. Investment we do (or don't make) into our asset base, will have an impact on our operational resilience. We are increasingly faced with shocks and stresses to our asset base caused by factors outside of our control. We need to ensure we have adaptability in our network to mitigate against these. These shocks and stresses include the changing demand profile of our customers, more extreme weather events, deteriorating raw water and a rapidly changing built environment around us. There are two principal areas of resilience, which are not covered by existing statutory planning frameworks or legal duties (WRMP, WINEP, eCAF, DWSP, Net Zero). These two areas are Production and Network Resilience.

Production Resilience – covers the operational resilience of our Production assets including our two major water treatments works (Hampton Loade and Seedy Mill), as well as our groundwater source stations and boosters. For our LTDS we have detailed our enhancement requirements for production resilience. The scope of this works includes power, automation and control, alternative supplies and booster stations.

Network Resilience – covers the operational resilience of our networks and the supply zones they feed. These assets include small and large diameter mains, service reservoirs, and strategic valves. For our LTDS we have detailed our enhancement requirements for Network Resilience (as per LTDS table LS3 and under line interconnectors). The scope of these works includes storage capacity, interconnectors, infrastructure renewals (small and large diameter) and valves.

Our operational resilience to shocks and stresses such as deteriorating raw water quality and water resources is covered in the WRMP and water quality sections of our LTDS. These enhancement requirements for our core and alternative pathways are driven by our Water Resources Management Plan (WRMP), Water Industry National Environment Programme (WINEP) and Drinking Water Safety Plan (DWSP). Our approach to developing the AMP8 business plan is inextricably linked to our 25-year planning for the LTDS (i.e. many of the models used for determining AMP8 investment have also been used for the LTDS core and alternative pathways). For more information on our approach to developing these plans (see appendix: 'SSC37 Our Asset Management approach to best-value investment planning through 2025-2030 and beyond').

Core Pathway for production resilience

To achieve our unplanned outage ambition, we largely need to continue what we are doing, and maintain our assets appropriately. As such, there is limited enhancement expenditure we are forecasting at our Production sites based on our current knowledge. The main areas of enhancement expenditure at our production sites will be covered under other areas e.g. Water Quality and Cyber/SEMD.

Enhancement – Production resilience

After consideration of all potential areas for enhancement expenditure on resilience over the next 25 years, our current LTDS includes expenditure for:

- Continuation of our power resilience programme (not including new sources of energy).
- New control systems to better manage processes on site.
- Duty/Standby streams for sites that are critical to supply.

Borehole resilience programme

We have an enhancement programme to drill further boreholes at sites that are critical to supply. This is particularly important for our Cambridge region where we use 100% groundwater and there are several regions where the source of supply is a single borehole on site. AMP8 will see completion of this enhancement programme with new boreholes at several sites in Cambridge. These boreholes are only be drilled at critical sites that are not likely to be impacted by the long-term water supply option to the region.

Power resilience programme

In PR14, we started a programme to improve power resilience at our production sites to reduce reliance on the grid, which is becoming more unstable. We have a prioritised list of production sites (including booster stations) where generator connection points or UPS will be installed to eliminate the impact of brownouts/blackouts. This programme will continue and complete in AMP8. Our energy transition programme will continue improving power resilience through deployment of behind the meter renewable sources and Corporate Power Purchase Agreements (see Net strategy section).

Production capacity

There is no core pathway investment to increase Peak week pumping capacity (PWPC) or deployable output (DO) from our two major treatment works in the Staffordshire region. However, similar to our alternative pathway for network supply resilience (increasing storage, new interconnectors), we may need to increase pumping capacity from these treatment work (particularly Seedy Mill) to ensure enough water can be supplied during longer periods of hotter weather. There is an AMP8 scheme to upgrade the SMTW re-lift pumps to support nearby zones.

Across our production assets we have differing levels of automaton and remote operability across the estate. In AMP9 we will invest in the production estate to standardise these aspects.

Core pathway for network resilience

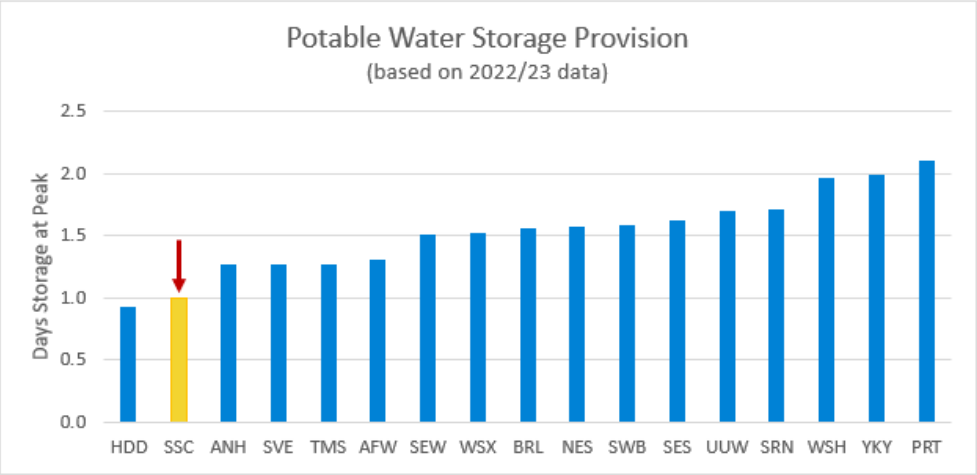
Our network assets are responsible for delivering water from our production sites to our customers. Our ambition for network resilience is to ensure that our customers have an appropriate level of supply security assuming availability of raw water and resilience at our production sites.

We are one of the leading companies in the sector for supply interruptions. However, we want to continue to improve our performance and ensure we remain a top performer through to 2050. To maintain this level of performance, which our customers have asked for, it is important we invest in our network to mitigate against the impacts of climate change specifically on these assets and remove single points of failure that would prevent us from delivering water reliably to customers during these events. Our network is distinct in two ways:

1. In the South Staffs region, we have one of the lowest levels of potable water storage in the sector. However, we do have one of the more interconnected networks.

2. In the Cambridge region, on the other hand we have greater amounts of storage, however the network is more disparate and not as well connected

Figure 8: Days of potable water storage across the sector



To achieve our supply interruptions ambition in the face of increasingly challenging operating conditions, we need to increase our levels of storage or build new interconnectors. This strategy is guided by the configuration and relative benefits of investment for each supply zone. In addition, we will maintain a programme of base capital expenditure that ensures our network ancillaries (valves, meters, etc.) are fit for purpose.

Enhancement – Network resilience

Achieving our supply interruptions ambition will largely require us to maintain asset health and operate effectively to minimise disruption when there are loss of supply events. However, after consideration of all potential areas for enhancement expenditure on network resilience over the next 25 years, our current LTDS includes expenditure for:

- New potable water storage within our supply zones.
- New interconnectors that allow us to move water between supply zones.
- Renewal of our infrastructure above the base expenditure allowance of 0.4%.

One of the fundamental building blocks in developing our core pathway was building a new resilience model for all our supply zones in our network. This was used to assess the core needs for network resilience (in terms of hours of storage available) into the future.

The model used details how the core pathway was developed, and the process to identify options for resilience investment is described in the rationale chapter. A summary of our core pathway spend for resilience (for enhancement expenditure only as aligned with table LS3) are shown below in table 11.

Table 11: SSC Core pathway for network resilience enhancement spend to 2050

Core pathway for resilience investment		
Delivery AMP	£m	Detail
AMP8	7.9	Additional Storage (50% base); Interconnecting mains (Infrastructure and base).
AMP9	16.6	A number of additional storage reservoirs
AMP10	3	Additional storage; network flexibility

5.5 Lead replacement strategy

We are committed to the removal of all lead from the drinking water supply system as soon as is practically possible, however the scale and cost of this work is extensive so we must manage this investment in the context of the risk it poses to drinking water compliance and the subsequent impact on bills for our customers.

The Drinking Water Inspectorate (DWI) is clear in its view that water companies must act to remove lead from supply pipes, and we support this stance. In AMP8, we will materially increase the rate at which we are removing lead from both the communication pipes that we own and the full supply length which our customers own. In addition to our existing AMP7 strategies of opportunistic communication pipe replacement during mains rehabilitation work and lead replacement associated with elevated sample results at the customer's tap we will also deliver two new projects in AMP8.

Lead – Developing our core pathway

We have undertaken a critical review of a number of components relating to the risk posed to our business by lead infrastructure:

- Our existing lead strategy
- Our historical spend
- Sample results and compliance
- Existing regulation
- Emerging direction regarding regulation
- Customer feedback
- Regulator feedback
- Performance and approach across the sector

The most material change that would impact our future direction would be either a change in the regulatory standard for lead compliance or a change in asset ownership around non water company owned assets. As both of these are regulatory changes, they are not included within this strategy but captured in our monitoring plan.

As part of our enhancement business case strategy for AMP8, we will invest approximately £7m to secure lead compliance, and replace approximately 2,000 lead communication pipes and customer supply pipes. These include:

1. Replacement of the complete service pipe (our asset and customer assets) for 373 schools and nurseries
2. Replacement of c1200 lead supplies as part of a more holistic supply pipe trial in a DMA to tackle share supplies, difficulties in metering, pressure challenges in addition to lead compliance. We have proposed a Price Control Deliverable (PCD)

associated with this workstream that will see us produce a report detailing the benefits of the trial by 2027/2028. This will then be used to develop our strategy for future AMPs in line with delivering the most effective route of lead removal for our customers.

The above enhancement spend is in addition to our proposed base expenditure, which will see us replace approximately 9,000 communication pipes relative to our mains renewal activity.

In future AMPs, we will increase our rate of lead replacements, increasing to a rate in AMP10 that is three times our current rate of communication pipe replacement which had been partly informed by customer preference. This will see us invest approximately £20m per AMP in today's prices. At this stage we have assumed that the expenditure is on communication pipes, however the outcome of the trials we are undertaking in AMP8 may change this, though we believe the overall investment per AMP is accurate.

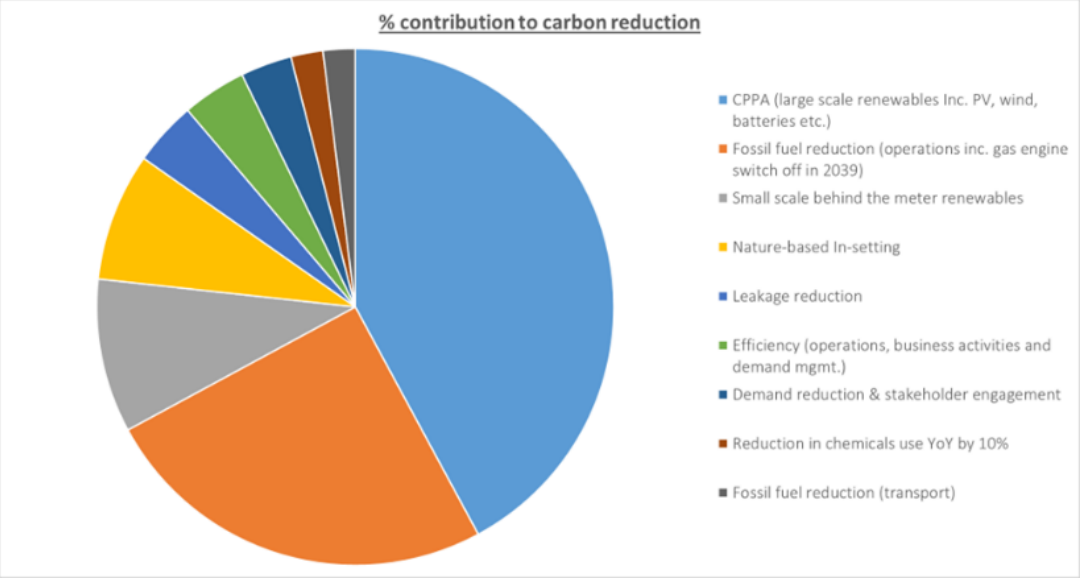
Orthophosphoric acid dosing at our water production assets has been very successful in safeguarding both public health and compliance since we, and the sector, started dosing it over 20 years ago. Water quality and public health is our main priority, so we will continue to dose orthophosphoric acid as long as necessary, and in reality this will be until we have removed all lead from the supply system all the way to customers taps, and verified that this is the case. We are presuming that orthophosphoric dosing will remain in place across our treatment works estate for the duration of the LTDS planning horizon.

5.6 Net zero strategy

Our net zero will be delivered through demand reduction, efficiency, stakeholder engagement, small-scale renewables, Corporate Power Purchase Agreements (CPPAs), replacement / decarbonisation of fossil fuels, and nature based in-setting solutions which target our value chain and communities.

We recognise that OFWAT excludes cPPA's from carbon reduction reporting, but we have included these dedicated contracts within the true NET carbon position and continue to be part of our plan.

Figure 9: Carbon reduction work streams



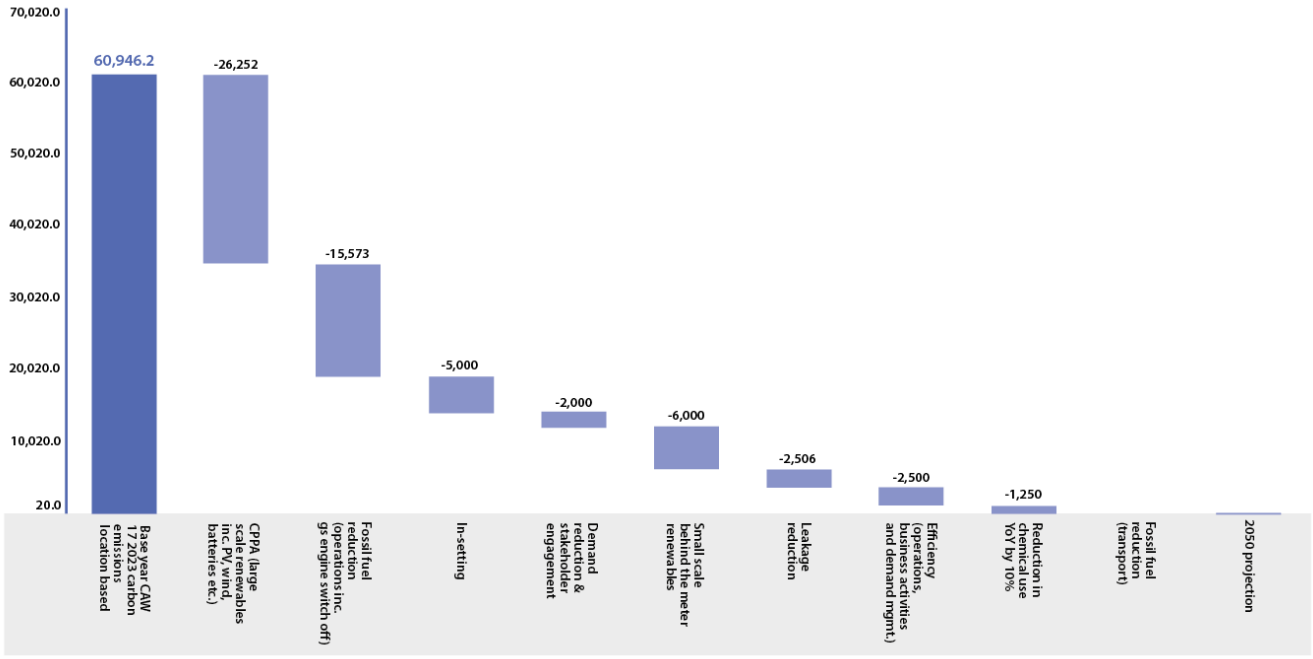
The five fundamental gateways will form part of all future decisions to comply with and target Net Zero 2050:

Gateway	Measured/commitment
Absolute carbon emissions reduction	Annual UKWIR carbon workbook (independently assured)
Affordability and cost efficiency	Enhancement cases OFWAT assured
Increasing resilience and security of supply	Progressive reduction in electrical grid supply in accordance with plan
Transparency and accountability to all our stakeholders, but particularly customers	Citizen jury with customers

The transition to a net zero carbon energy system is a key contributor to South Staffs & Cambridge Water Net Zero emissions objective. We have committed to a five-year carbon budget period (commencing AMP8: 2025 to 2030) as part of our PR24 submission.

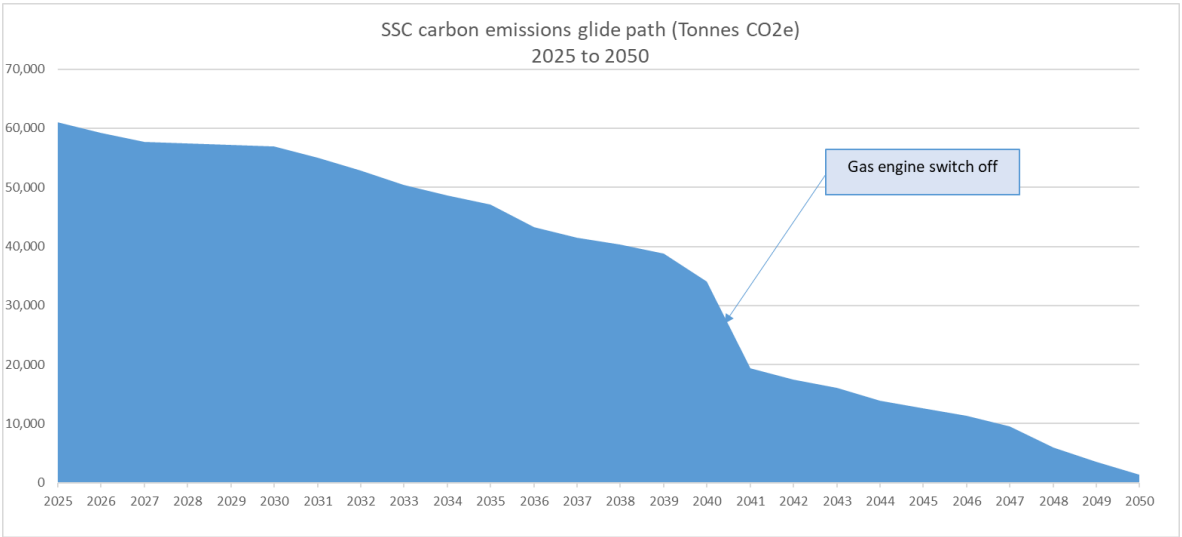
We acknowledge the renewable industry and technology is well engrained and data easily defined and therefore our plan relies upon the utilisation of wind and solar installation over the coming 25 years coupled with additional benefits such as in setting. Our analysis confirms a reduction in carbon associated with the following focus areas.

Figure 10: LTDS Net Zero 2050 carbon reduction waterfall

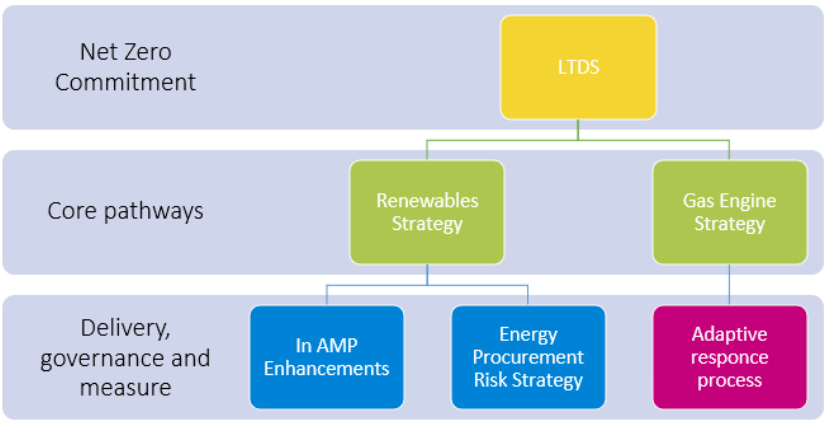


In-year benefit demonstrated in the carbon reduction glide path shown below.

Figure 11: LTDS Net Zero carbon reduction glidepath



To achieve, monitor and govern the accepted 2050 target, a core of interlinking strategies approved and supported by our customers and internal stakeholders where appropriate have been developed. They have been established to clearly track performance, progress, and establish risks associated with the delivery of our commitment.

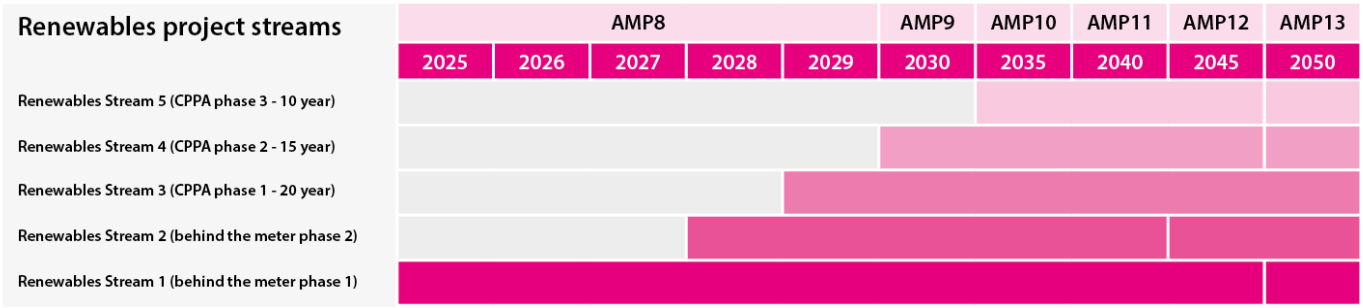


Renewables strategy

The foundation and building blocks for the net zero transition to 2050 will be in AMP8 as we accelerate our plans for increasing low carbon and renewable energy and reduce our dependency on grid imports, while still driving for greater resilience and protecting our stakeholders, including customers, from the uncertainty and potential shocks of a global energy market.

The renewable energy mix is likely to include behind the meter (BTM) solar panels, micro-wind and utilising our own estate and land where possible for maximum cost efficiency. We will also be looking to participate in a multiple of corporate Power Purchase Agreements enabling a longer-term hedge and price certainty which is fundamental to this progressive plan.

Figure 12: Renewables project schemes



Gas engine strategy

The power resilience coupled with the significant financial benefit to customers delivered from our 2019 gas engine investment is set to be in operation until the forecasted end of asset life, 2039. Our gas engine strategy also considers a trigger point of financial benefit whereby the spark spread (common metric for estimating the profitability of natural gas-fired electric generators) is forecasted to be uneconomical to maintain and operate the asset and therefore would be decommissioned.

This will reduce SSC total carbon emissions by circa 19,000 tonnes CO2e assuming 100% substitution with zero carbon energy. The net zero roadmap has assumed an absolute reduction of 15,573 tonnes CO2e. This provides some tolerance within which to mitigate any shortfalls in actual emissions reductions and accommodate alternatives / substitutions; including innovation and emerging technologies.

The implications of this strategy mean that without significant in-setting we will not meet the sector commitment of Net Zero Operational emissions by 2030 (end of AMP8); however, this strategy provides the optimum balance of operational efficiency, affordability, risk management and an achievable trajectory to 2050 with Net Zero operational emissions by 2040 (AMP10).

Energy procurement risk management

The objective of our EPRM strategy is to optimise operating costs, budget certainty, resilience, security of supply and enablement of our net zero transition, through robust governance and controls which reduce our exposure to volatile global energy markets, while accommodating a changing regulatory landscape. This will be reviewed and updated In advance of every AMP period becoming the main enabler to realising the renewable benefits without increasing a cost premium (firming etc).

The transition to a net zero carbon energy system is a key contributor South Staffs & Cambridge Water achieving net-zero emissions 2050 target. We have committed to a five-year carbon budget periods (first one AMP8 2025 to 2030) as part of our PR24 submission. This plan aims to continue to drive short-term progress towards the ultimate goal of a decarbonised energy system for all our energy consumption. Our objective is to reduce our reliance upon grid electricity and become self-sufficient in affordable renewable energy where possible.

AMP8 Energy strategy

Our AMP8 strategy sets the baseline and structure for replication in future AMPs thus increasing the number of Power Purchase Agreements (PPAs), CPPAs (Corporate PPAs) and behind the meter (BTM) renewable sources of energy maximising the total value of all available company owned land; where there is a consistent energy load in close proximity.

Repeating this strategy in every AMP, as we head towards 2050, allows the individual energy generator contracts (BTM and cPPAs) to expire incrementally in a staggered but controlled rolling time period. By design this creates layers of price points in our energy generation stack thus controlling and limiting our exposure to wholesale energy markets. This provides not only budget certainty at a competitive price but progressively decarbonises our emissions whilst allowing for take up of new innovation and technology along the journey. The foundations of the methodology and assumptions for net zero are described in foundation chapter.

5.7 Cyber strategy

In delivering our long term delivery strategy (LTDS) for cyber security, we have considered the UK Governments Cyber Security Strategy 2022 – 2030, and, current regulatory targets including the DWI CAF-SSP and DWI-ECAF targets.

Our approach to enhancing cyber security over the LTDS period is based on continuous risk assessment to deliver a no/low regret plan. Cyber risk will be assessed based on current and emerging threats, and, changes in government guidance and regulation. It's our ambition to maintain a low to very low risk profile over the LTDS period to ensure we mitigate future risk and continue to protect the essential service.

Beyond 2030, it is very difficult to predict what cyber security will look like in terms of challenges and threats. For certain, we will need the ability to react quickly as threats emerge and change, and, we expect government guidance and legislation will change in response. This will require us to continuously manage cyber risk, monitor guidance and legislation and, have flexible investment plans that allow us to respond to change quickly.

Our cyber LTDS is based on achieving the following key strategic outcomes:

- By March 2025, we aim meet the DWI SSP-CAF target, to protect against limited capability attacks.
- By March 2028, we aim to meet the DWI E-CAF target, to protect from moderate capability attacks.
- Our ambition is to maintain a low risk profile throughout the LTDS period by addressing moderate and high risk in a timely, pragmatic and cost-efficient manner.
- Assessment of risk will be based on the formalised risk management process looking at probability of events happening and the impact to ensure we include no/low regrets investment to minimise risks.

Key investment areas

It is not possible to determine investment specifics so far in advance, given the pace cyber security changes, however, our drivers for investment align with the government's cyber security strategy 2022-2030, and with the objectives defined by the current CAF. Beyond 2030, it is likely we see a continuation of the same drivers however it is likely ever more complex and possibly targeted attacks, including state sponsored attacks, will require investment in technologies and solutions not yet developed. Therefore, we have adopted a more generic approach for LTDS for cyber beyond AMP8.

The following describes the areas likely to require investment in order to achieve our strategic ambition to maintain a low risk profile throughout the LTDS 25-year period.

Manage security risk

Investment will be aligned to CAF Objective A and will be needed in terms of asset management, governance and risk management systems, people and processes, to ensure we manage and assess risk by having a clear and visible understanding of critical IT and OT systems and assets. Ensuring this results in clear accountability and robust assurance of risk will be key to managing risk in line with our ambition to maintain a low cyber risk profile.

Protect against cyber attack

Investment will be aligned to CAF Objective B and adopts a protective stance that will be inextricably linked to and driven by our assessment and management of risk. While it will never be possible to protect against all attacks, we aim to be able to demonstrate that we have appropriately considered all IT and OT cyber risks and have implemented protection in line with our assessment of risk. This includes being aware of new and emerging risks through the LTDS period and responding proportionally.

Proportionate cyber security measures to protect us from attack will be embedded in the technology we use. The technology used will be designed, configured and managed in line with the principles of CAF objective B and both government and industry guidance. We will also aim to develop capabilities, tools and services to address cyber protection issues at scale, by improving cyber security across the organisation as well as driving efficiency and value for money.

Detect cyber security events

Investment will be aligned to CAF Objective C and builds on the foundation of risk management and commensurate protective measures, we will continue to develop capability to detect cyber security events across our OT and IT estate.

This means having in place and maintaining technology and processes capable of detecting anomalous activity across our OT and IT systems, networks and services before they become events. It is very likely future attacks will increase in complexity. Ensuring our detection systems keep pace with evolving attack techniques is critical to protect the essential service.

Minimise the impact of cyber security incidents

Investment will be aligned to CAF Objective D and even with effective risk management, proportionate protective measures and detection capability, the risk of OT or IT being impacted by a cyber security event remains. We will therefore ensure we are prepared and able to respond to cyber events by maintaining a strong capability to restore affected OT and IT systems and assets with minimal or no disruption to the essential service should a cyber event occur.

This also means looking at the design of our abstraction, treatment, distribution and storage systems and assets to see if we can mitigate the loss of OT or IT such that it would have minimum or no impact on our ability to supply water. Whist solutions in this space may not require investment in cyber security under the LTDS, we intend to look at the fundamental design of production and distribution systems for future systems to see, where possible, if we can reduce the dependency on OT and IT should these systems require restoring following an incident.

Key assumptions underpinning cyber strategy are captured in the foundation chapter.

5.8 SEMD

The vast majority of our SEMD spend was delivered in AMPs 5 and 6 with a small amount of carryover spend being delivered in AMP7 (£0.3m). The same is true for AMP8, where we are planning to spend approximately £0.5m across the AMP on a handful of small projects. These projects have required investment either due to additional scope being identified, or due to the to the security requirements increasing due to increased antisocial activity / criminality being observed at a small number of our sites.

All investment has been heavily scrutinised internally, via external audit and by the Drinking Water Inspectorate (DWI) to confirm the need for the spend.

Given our investment has been relatively flat in recent AMPs we have projected this to continue throughout the period. Spend is entirely to ensure compliance with the SEMD regulations and guidance, so is entirely 'no regrets' as it directly delivers a regulatory need.

No alternative pathway proposed. Change in regulatory requirement, guidance or interpretation would be the only material change in direction, which is excluded from this analysis as per Ofwat's guidance.

6. Our alternative pathways

As a water only company, the number of alternative pathways we can feasibly develop is limited, so we have taken a proportionate approach and focus on those areas that are most critical for us, we will of course continue to build on this work over time.

We know that our core pathway under more adverse scenarios will not deliver our planned ambition targets. We recognise that a core pathway that could do this would be over engineered and not low regrets – and therefore not in the best interests of our customers.

Following scenario testing our core pathway against all of Ofwat's common reference scenarios, we have identified two alternative pathways where additional investment is required to ensure we are able to deliver our ambition targets under certain circumstances. These are for the low technology scenario and high climate change scenarios as shown below in table 12 and corresponding investment areas triggered.

Table 12: Scenarios where an alternative pathway was identified

Scenario	Key areas where additional investment triggered			Alternative Pathway (AP)
	WRMP (incl. SDB/Environment)	Resilience (operational)	Water Quality (production)	
Low Technology	Y - triggers more demand management investment	N	N	AP1
High Climate Change	N	Y - triggers resilience investment e.g. storage	Y - triggers investment due to deteriorating raw water quality	AP2

For the full range of the individual common reference scenario tests and detail is covered in common reference testing in the rationale chapter.

6.1 Alternative Pathway 1 (AP1): Low technology scenario

The low technology scenario was tested against our core plan in which the key difference and impact to delivering our ambition targets in relation to our demand management programme was the delay in delivering full smart metering by 2045. Slower delivery increases the overall cost of the programme as it takes longer to recognise the efficiencies that new technology can unlock.

The delay in smart networks by 2040 and limited progress in open data had potential to stifle innovation affecting the pace on delivering or realising benefits quicker which has not caused material impact or affected our ambition targets overall but has been captured in our monitoring plan.

6.1.1 Additional investment for demand management

Our preferred WRMP plans for both regions are mostly aligned to the high technology scenario. For the low scenario, the slower delivery or delay in delivering smart metering by 10 years impacts on the cost of our demand management programme as a result. It does not alter spend associated with supply side options in Cambridge region (where the need is greater) as this is driven by abstraction licence reductions. However, our demand management plans are built to deliver the Environment Act targets, and once smart metering is in place, the plan is able to select more cost efficient options to deliver both leakage and water efficiency reductions e.g. innovative tariffs, more efficient leakage detection etc. By delaying the implementation of smart metering and therefore the data we would receive from this, we need to utilise less cost efficient options for longer in our plan to ensure we meet the Environment Act targets.

As a result, our programme costs in AMP9 reduces as we spread the cost of our universal metering programme further due to the delay assumed for this low technology scenario. However, we then see a significant uplift in the programme cost for AMP10 between 2035-2040 of almost £25m due to the delayed meter install spend as well as increase spend on and water efficiency programmes in

order to ensure we still hit the Environment Act targets. Overall, the low technology programme costs an additional circa £15m compared to our core pathway investment programme (all costs are shown for the low technology scenario are shown in table LS3b in appendix: 'SSC04 Data tables submission')

Our demand management programme will be monitored and reviewed frequently to ensure we are on track to meeting out targets (as described in our monitoring plan in foundations chapter)

6.2 Alternative Pathway 2 (AP2): High climate chance scenario

Under this scenario a high climate change assessment (RCP8.5) was undertaken to understand the impact to our core pathway investment areas. Two investment areas triggered the need for additional investment to ensure we can deliver our ambitions this was our operational resilience and water quality.

6.2.1 Additional investment for resilience

Resilience and Interconnectors:

It is well documented and researched that a high climate scenario (RCP8.5) would result in prolonged periods of dry weather, as well as more extreme heatwaves. The effects of this on our water supplies are also well evidenced, particularly in recent years where we have experienced hotter summers and record-breaking temperatures. The impact of this is that despite consumption reducing, these hotter periods bring dramatically elevated usage coupled with reduced raw water availability.

Our Supply Zone Resilience Model can replicate these conditions by reducing reservoir levels (reflecting a lack of raw water) and adjusting the demand. This allows us to stress-test our network and identify under what conditions, and environmental factors, customers would be put at risk of losing supply. Throughout this process we maintain our ambition of achieving close to 24 hours emergency storage in every zone, unless there is a suitable level of alternative supplies and interconnectivity to other zones.

From this model, we identified zones that would not meet our ambition under a high climate scenario. Our core pathway investment was considered first, before identifying if further investment would be required to achieve our ambition. It is difficult to identify an exact year when we would know we are on the RCP8.5 pathway as opposed to the current most likely, or even the low scenario. Part of our monitoring plan will be to track global climate forecasts, which are likely to change as we see a push towards net zero emissions in the 2030s by much of the infrastructure sector.

Infrastructure renewals:

We have developed a new model for predicting bursts and identifying renewal rates for AMP8. This model also forecasts to 2050 and now includes climate parameters that can have a material impact on deterioration of our distribution mains. The new model is based on machine learning principles, and therefore requires time to train so an accurate forecast can be developed. Results from this model validated what we have observed in recent years during extreme weather scenarios. After cast iron material pipes, the next most significant parameter within the model is air temperature, followed by age and then rainfall. Climate-sensitive parameters such as air temperature and rainfall appear in our top five parameters driving burst rates across our pipe cohorts.

At the time of writing this LTDS, we do not observe a substantially material increase in deterioration rates to 2050 even with climate parameters included. As a result, no additional enhancement expenditure for renewal >0.4% has been included. Early results from the model indicate this is likely to change as we gather more data during periods of more extreme weather.

The alternative pathway was triggered due to high climate change reference scenario with a key trigger point being 2040. The key indicators were a sustained change in demand profile and longer periods of hot weather during low flow.

Table 13: A summary of our alternative pathway for Network Resilience to 2050 (enhancement expenditure only)

Alternative pathway for resilience investment		
Delivery AMP	£m	Detail
AMP 10	12.4	Additional interconnecting mains and storage
AMP 11	25.8	Additional storage in AMP11
AMP 12	18.4	Additional interconnector mains (Infrastructure) for growth

6.2.2 Additional investment for water quality

We have worked with consultants (Atkins) to understand how the impacts of climate change affect raw water quality, and at what point is our existing infrastructure no longer fit for purpose. The analysis undertaken evaluated the potential risk to drinking water quality at Hampton Loade and Seedy Mill water treatment works, related to climate change impacting river flows under the Ofwat high climate change scenario.

The key findings from the assessment included:

- Changes in the frequency of low events are greater and of more significance than changes in the frequency of high flow events.
- More frequent low flow events will increase the numbers of days on which abstraction from the river is constrained. This may increase the need to abstract water more often on other days when water quality is poor, reducing the degree to which water quality passing into the treatment works can be managed at the intake.
- Some increase in algal populations are projected in the River Severn due to an increase in low flow events but these changes are modest and unlikely to result in a substantial increase in the risk to drinking water.
- A moderate increase in inputs to phosphorus and nitrate into Chelmarsh Reservoir is predicted which could increase eutrophication of the reservoir and associated water quality problems (i.e., algal blooms, taste and odour, algal toxins and organic load to the works.
- These changes are likely to occur in the medium term from 2040 onward and increase in magnitude beyond this date.
- Mitigation options are presented in the form of adding new process to the treatment stream, or by increasing storage. Because the most significant impacts are related to increased frequency of low flow events, storage is likely to be the preferred option.
- Consideration should also be given to catchment solutions including nature-based solutions beyond this project.
- Before these changes in water quality at the intakes come into effect, water company investment in nutrient removal and implementation of the Severn to Thames regional water transfer scheme may modify these risks. These influences would need to be considered before water company investment takes place to mitigate the projected increased risk to drinking water quality.
- This project is high level in nature and only presents general information on options and costs.

Impacts of climate change such as changes in water temperature or changes in land use were not considered as part of this assessment but are key areas of note that will need be monitored ahead of any investment decision. the key uncertainties and analysis is further detailed in appendix: 'SSC32 Long-Term Delivery Strategy climate change impacts on raw water quality technical report'.

Towards the end of AMP9 for the high climate change scenario, analysis suggests that our existing infrastructure will no longer be able to meet our regulatory needs, and therefore an alternative pathway for water quality was triggered around 2040 onwards. The additional investment activities required are summarised in the table below.

Table 14: Summary of core and alternative pathway activities for water quality (treatment surface water)

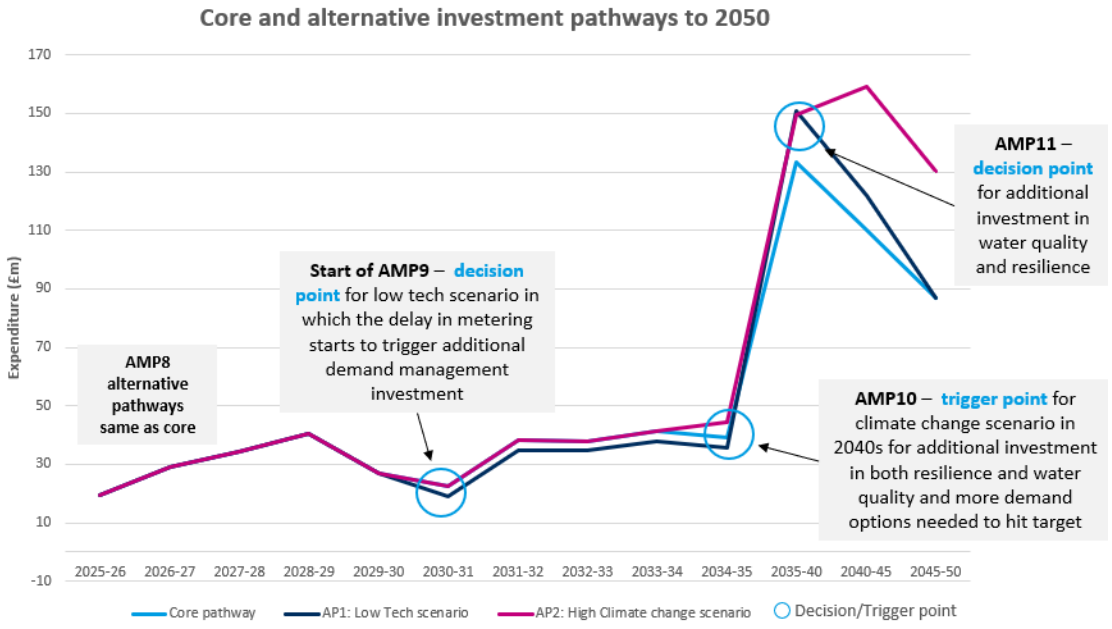
Treatment – surface water core pathway		
AMP	Core pathway	Alternative pathway
AMP 8	Optimisation of new (AMP7 installs) at HLTW & SMTW. Enhanced performance monitoring	No change from core
AMP 9	Understand and plan mitigation for bringing surface water into our groundwater only Cambridge region	End AMP9 trigger point – £5m / AMP10 – £4m New treatment processed to manage an increased level of organics coming onto our surface water works – 2040 as the trigger point identified. The most effective treatment solution would be an advance oxidisation plant, firstly at HLTW, then at SMTW. These treatments would enable us to meet our THM (Trihalomethane) regulatory requirements.
AMP 10	Process treatments to safeguard AoWtC	
AMP 11/12	Process treatments to safeguard AoWtC	AMP11 – £23m / AMP12 – 25m In addition to a further level of treatment, analysis suggests that additional raw water storage at both surface water works would support the delivery of our regulatory contract, and make us more resilient to the shocks and stresses we would see in the high climate change scenario. The cost confidence of such schemes are currently quite low and will be a key area we will monitor and adapt our core to include feasibility or pilot studies before trigger points.With affordability in mind we have spread this investment over the last 2 AMPs of the planning period, prioritising HLTW first, then SMTW.

The methodology undertaken to develop our core and alternative pathway assessment and evidence of trigger point is further described in the rationale chapter.

6.3 Our LTDS core and alternative pathways

Below figure 13 shows a summary of our core and alternative adaptive pathways across the long-term horizon up to 2050 which ensure our strategy meets all plausible scenarios and ensure we act timely to achieve our long terms targets and ambitions. All costs are detailed in the LS tables in appendix: 'SSC04 Data tables submission'.

Figure 13: Our LTDS Core and alternative pathways to 2050



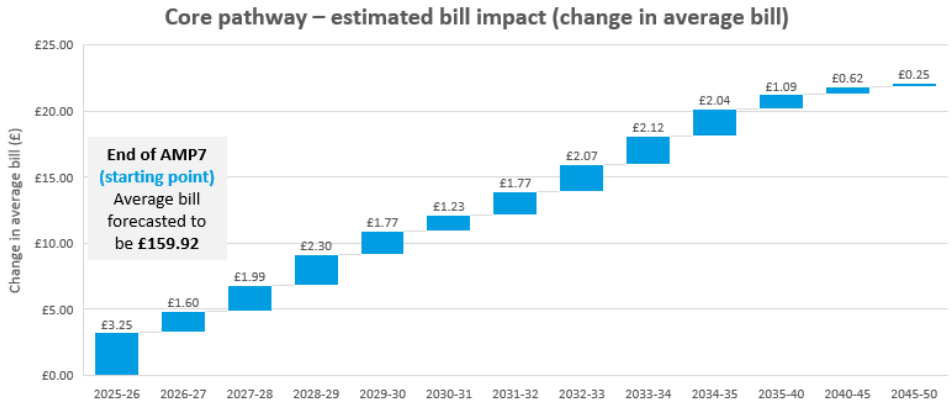
7. Estimated bill impacts of our core and adaptive pathways

The estimated bill impact was calculated separately for our core and each of our alternative pathways. This shows the change in average bill value based on our PR24 business plan assumptions. We have used Ofwat's required approach for the calculation of long-term bill impacts as set out in Appendix A2 of the final guidance on long term strategies. In particular:

- The WACC as submitted in our business plan of 3.69% CPIH real.
- An average asset life of 55 years which is consistent that for enhancement expenditure in our AMP 8 plan.
- The level of operating costs remains consistent over the period, in line with AMP 8.
- Incorporated tax and retail margin.

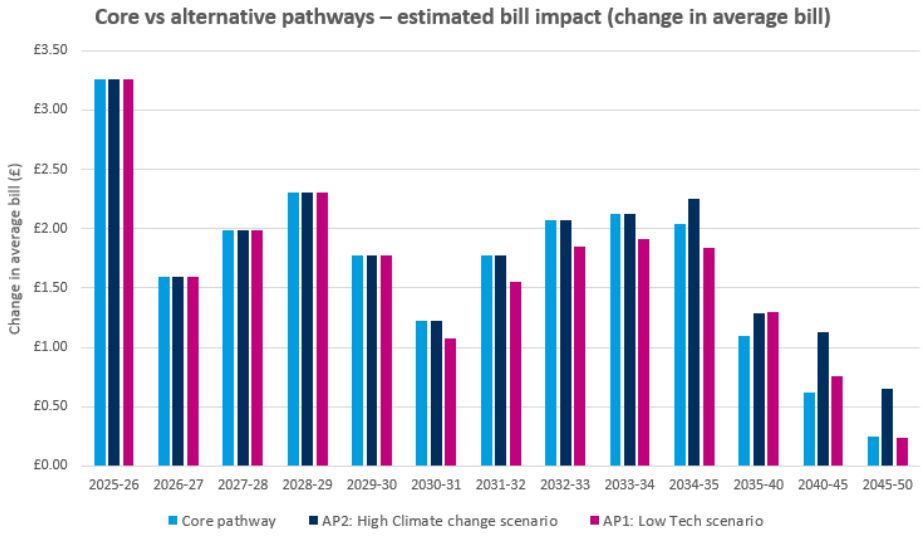
Consistent with our business plan submission, we have excluded Fens Reservoir from both the core and alternative pathways. Please see appendix: 'SSC03 Fens Res – our approach into AMP8'.or more information.

Figure 14: Core pathway – estimated bill impact



The resulting annual bill change outputs have been used to populate table LS7 (see appendix: 'SSC04 Data tables submission')

Figure 15: Cost vs. alternative pathways – estimated bill impact



Bills have been smoothened where possible taking on board customers feedback and key findings from our intergenerational fairness research where customers preferred a natural bill profile rise spread across generations which has been reflected.

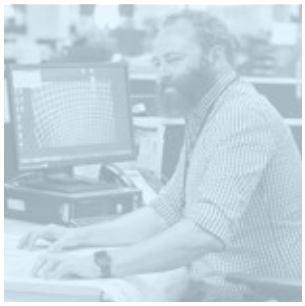
We have used a bill calculator for our core pathway and our two alternative pathways. These have been submitted as requested alongside the business plan to see the underlying calculations. See files:

- Bill calculator_Core pathway.xls
- Bill calculator_High climate change.xls
- Bill calculator_Low tech.xls









Part 4: Rationale – why this strategy is the best one for us

8. Building on the approach taken during AMP7

We are a business that has always planned for the long term. This is so we can be sure we meet our customers' expectations of the services they want us to deliver, efficiently and effectively.

But in developing our plans for the current AMP, we took a step change in our long-term planning approach, developing a new decision-making framework to help drive the right investment across the business.

8.1 Adopting a resilient investment approach

At PR19 we used a new decision-making framework to help with our decision-making about the investments for the current AMP that represented the best value for customers and the environment. This was a different approach to that taken with previous business plan submissions and enabled us to take a more holistic view of the long-term supply capabilities of the networks across our Cambridge and South Staffs regions.

We adopted this approach for two principal reasons.

- First, we recognised the importance of looking beyond the five-year regulatory cycle, enabling us to consider both our immediate and long-term planning and investment needs.

- Second, we wanted to identify whether there were alternative approaches that might benefit current and future customers, and help to deliver intergenerational fairness.

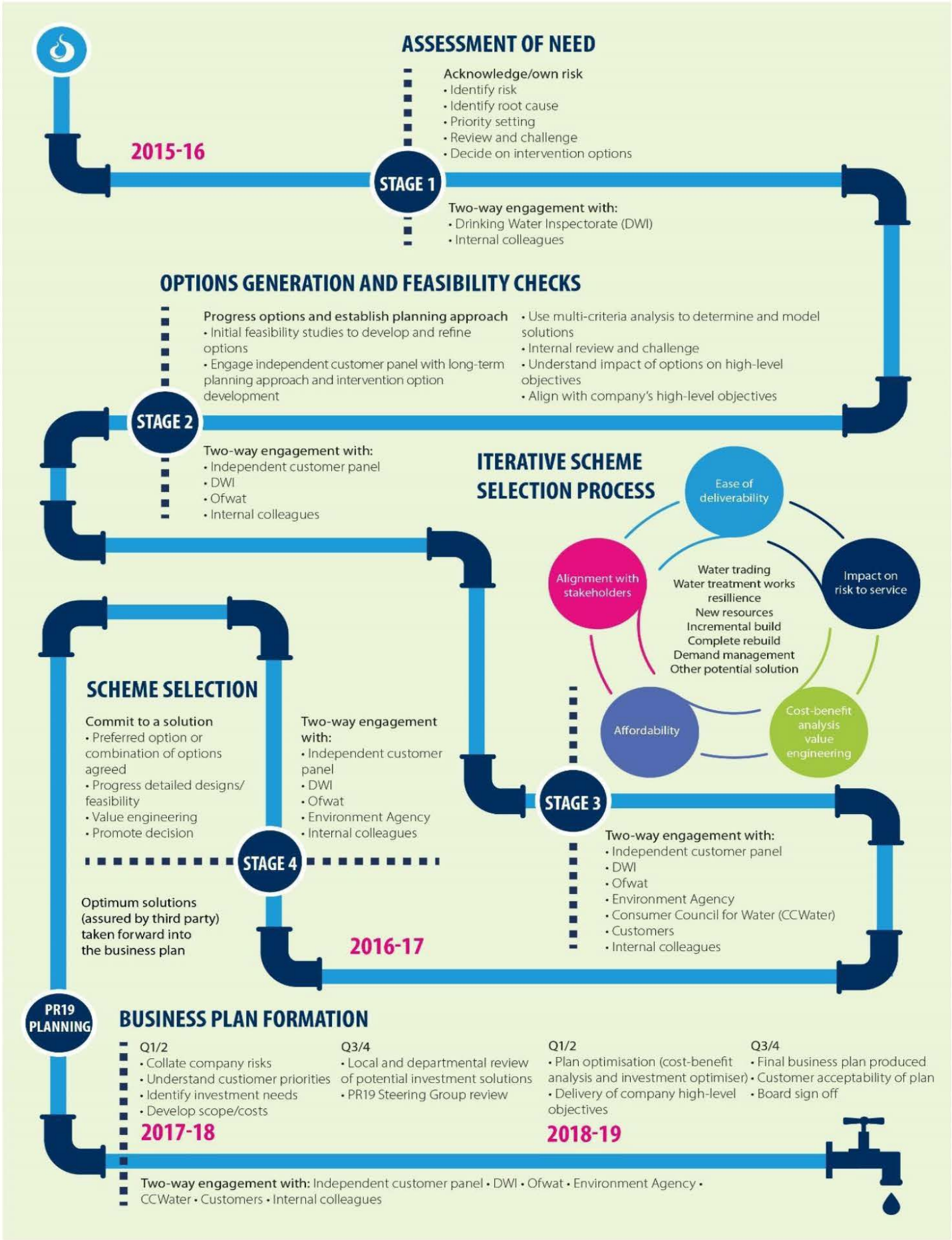
So, we reviewed and evaluated all our existing operations across the water resources in both regions. We worked with third-party contract partners to develop a robust and flexible decision-making framework to guide a long-term planning strategy and help us to select the optimum portfolio of investment options that formed the basis of our business plan for 2020 to 2025.

Our decision-making framework enabled us to compare the full range of options available to us against each other and select the best combination of them for our customers and the circumstances of our business. The options we considered at the time included:

- water resources and water trading, appraising all our water sources and arrangements with neighbouring water companies to ensure we can always maintain reliable supplies to customers;
- demand management, by reducing leakage on our network of pipes and also by educating our customers about the need to use water wisely;
- refurbishing or rebuilding our major assets, including upgrade programmes at the largest water treatment works in our South Staffs region;
- developing our groundwater sources across both regions.

The main stages of our decision-making framework are set out in figure 16 below.

Figure 16: Our PR19 decision-making framework



Our decision-making framework enabled us to move away from a 'one size, fits all' approach, demonstrating that least-cost options are not the only ones we should consider. This represented a step change for us – it meant aligning our approach to how we manage our assets with our 25-year WRMPs, and gave us a clear line of sight between our preferred plan and the services our customers expected us to deliver over the long term.

We fed the outputs from our decision-making framework into a multi-criteria analysis (MCA) model, which went beyond the cost-benefit analysis that we used in previous business plan submissions. Our MCA model enabled us to incorporate qualitative and quantitative appraisals of the investment options across a broad range of business objectives. It also enabled us to take a much longer-term view of the challenges we will face in the future in terms of water quality, changes in demand and climate change. And it allowed us to assess and evaluate trade-offs between investment options across competing objectives while considering a wide range of scenarios to ensure flexibility to adapt to changing future.

8.2 Building on our approach for PR24

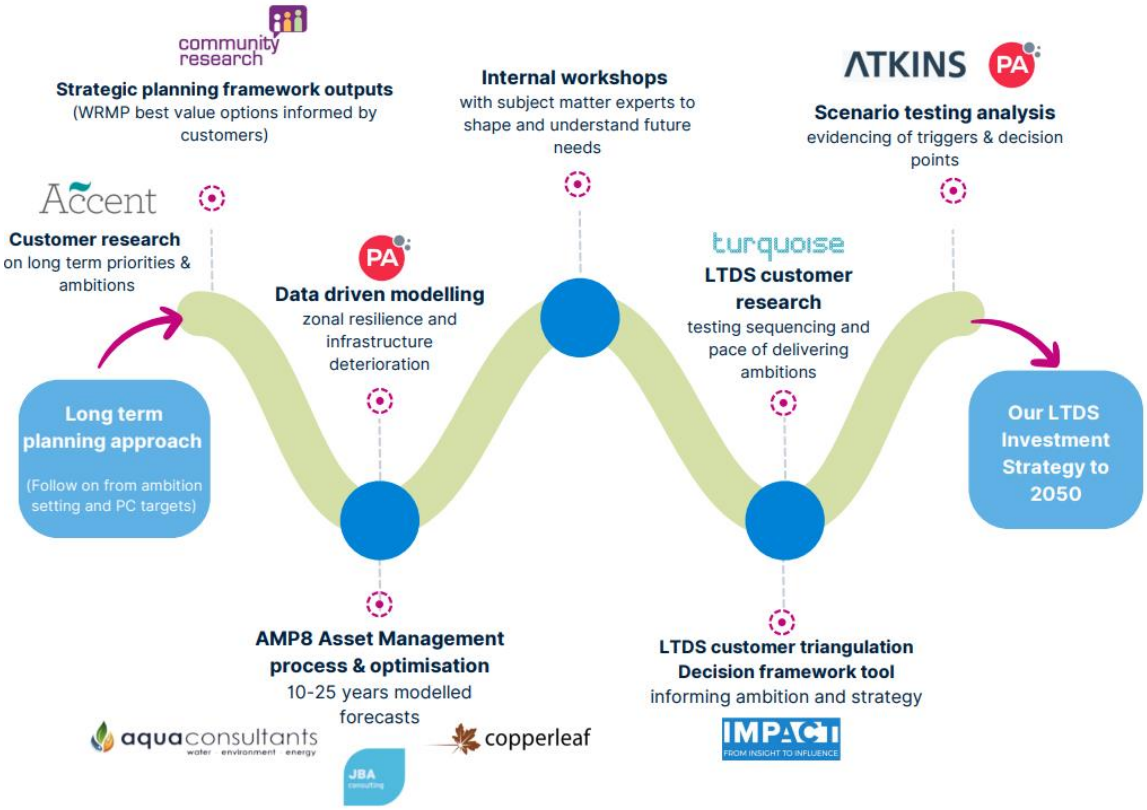
For AMP8, we have placed even more emphasis on setting our plans within a long-term context. At the same time, we have taken on board the findings of Ofwat's 'asset management maturity assessment', published in March 2021. This has led us to create an extricable link between our asset management plans, our business plan and this strategy.

Building from PR19, we have further developed a variety of new optimisation tools and techniques in PR24 to determine the best value package of investment options going forward. This follows on from taking on board feedback we received from Ofwat on our Asset Management maturity assessment at PR19, and our desire to continually improve our asset management capability.

For our LTDS we used similar models and optioneering processes and decision trees to build future AMP investment plans as we did in AMP8. We also consulted with a range of stakeholders including our own staff across the business (from asset operators to asset owners and the leadership team) over several workshops to ensure we capture long term risks and emerging trends and no/low regrets options.

Our customer research and engagement work has also helped to determine priorities and preferences, which has been incorporated into our approach in developing options. Our approach and key inputs to developing our long-term investment plan for AMP8 and beyond to 2050 is shown in figure 17 below:

Figure 17: key steps and inputs in developing our long-term investment plan to 2050



We recognise the importance of linking our AMP8 plans with the long-term. Thus, many of the new approaches, tools, and models we developed serve both our AMP8 plan and LTDS. In many cases, the same tools, techniques, systems, models and approaches have been used with a longer time horizon selected. For example, our new model for predicting bursts spans the full horizon of the LTDS, builds in new variables driven by the common reference scenarios (notably climate change in this case), and determines our 5-year infrastructure renewals expenditure linked to the desired AMP8 performance commitments. This has created an inextricable link between our asset management plans, business plan and the LTDS. Whilst there are areas we can still improve, we are pleased with the coverage of models and data-driven approaches to decision-making across all horizons. Our AMP8 enhancement business cases also show a- strong link between our AMP8 investment plans as no/low regrets investment and our LTDS.

How we responded to Ofwat's Asset management Maturity Assessment and more detail on our processes and decision-making tools can be found in appendix: 'SSC37 Our Asset Management approach to best-value investment planning through 2025-2030 and beyond'. This reinforces the importance of focusing and developing options in the context of the long term.

Our WRMP forms a core part of our investment programme. Our WRMP and WINEP programme have their own options development processes that follow sector guidance - the Water Resource Planning Guidelines to develop our options.

We worked collaboratively with our environmental regulator to ensure that the optioneering process supports development of an affordable and realistic plan, thereby aligning with our definition of a low or no regrets activity. Nonetheless, when options from these frameworks were added to our overall asset management investment portfolio, we added further options around phasing and deliverability where appropriate to do so to optimize best value option selection.

As whilst the sector guidelines specify a way for developing options, there is flexibility in pace and design that we can optimise to deliver the best value for our customers in the LTDS.

As part of developing our WRMP we have undertaken an extensive and rigorous optioneering process from identifying all potential solutions to ensuring we are able to meet the supply and demand needs of our regions over the planning period to 2050 and beyond. Our WRMP option development for our core and alternative pathway is further described later in this chapter.

Case study: why our metering strategy is the best approach

In determining our demand management plan developed as part of our WRMP24 options appraisal process we considered and tested PCC and smart network scenarios, which represents an integrated approach to demand management built on the foundation of installing smart meters on all households.

This universal approach to metering all households in both of our regions by 2035 (as reflected in our core investment pathway) will be a key enabler to support and drive our demand management activities. This includes activities such as identifying and fixing leaks quicker, informing behaviour change programmes by providing more information to customers, as well as introducing innovative tariffs. This will all help enable and contribute to delivering our interim and long-term demand management reduction targets such as reducing PCC to 110 l/p/d by 2050 and support us in achieving our ambitions in reducing leakage, business demand and carbon and energy.

Our plan for AMP8 assumes these smart meters will be a continuation of installing our current choice of meters, which are AMR (Automatic Meter Reading) meters that are easily configurable and compatible with AMI (Automatic Meter Infrastructure) network solutions. There are a series of reasons for this, the first is that the existing available AMI networks in our area of operation are not currently in place to support the widespread roll out of AMI meters, and therefore the increased costs for installing upfront infrastructure at this stage means the costs outweigh the benefits as part of our cost benefit assessment analysis. Equally, at this moment there is no clear leading network provider or network strategy which can provide guaranteed read success across a range of post codes and circumstances. Furthermore the network and technology options within the market continue to evolve every year. Thus, we are well placed in continuing to roll out AMR meters with AMI compatibility as our preferred approach and continue to expand our well-established drive-by reading approach, which is more cost effective (with greater cost certainty) and can be tailored to provide more frequent reads. Alongside this we will still pursue the roll out of AMI meter reading but in a measured and phased approach by converting our existing installed meters and standing up AMI networks on a scheme-by-scheme basis in order to select the best technology and network options at the right time.

Whether rolling out AMR or AMI meter reading there is a consistent cost for the meter itself and for the data repository/analysis tool. When reading meters through AMR (drive-by) we have the cost of the meter reading device (which receives the read data from the meter and transports to the repository) and there is an equivalent for AMI which is an antenna, both costs a similar amount. The major cost difference between AMR and AMI is the cost of the network that AMI uses which AMR does not. We have benchmarked some of the current AMI network options and using a theoretical roll out rate of 30,000 meters/year (baselined off a scheme that South West Water are currently rolling out) we expect the network costs would be between £390k and £660k per year alone. The

equivalent cost in AMR is the vehicle that we will use in drive-by reading and as we plan to expand and trial the number of bin lorry routes (for which we pay a negligible amount) and potentially company vehicles (no extra cost to the business) alongside exploring bus routes (which we expect to also be negligible).

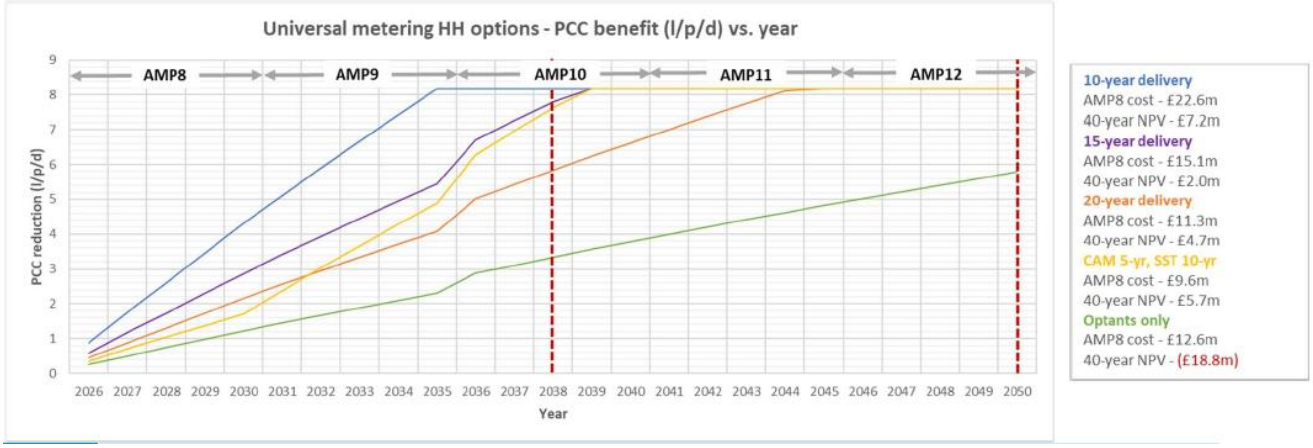
We recognise industry studies and analysis have been undertaken to understand the additional benefits of moving towards AMI meters which currently only two water companies have started to roll out universally, whereas industry learnings for AMR are more well established. During AMP7, several companies are undertaking extensive smart metering programmes, including Anglian Water, Sutton and East Surrey Water and Thames Water. Through discussion with these companies and a detailed review of the results they have achieved through AMP7, we are proposing to adopt a 13% saving due to behavioural change upon installation of a meter to an unmetered property with the customer switching to being charged based upon measured volume. We have also assumed a behavioural change demand reduction of 2% when replacing a dumb meter with a smart meter due to having more frequent and granular data. These estimates are based on the results seen by both Anglian Water and Thames Water and is in line with the experience in the energy sector.

Our strategy focuses on moving as many unmetered customers as possible to AMR meters at this stage as not only does AMI increases cost significantly, but also more time needed to test feasibility and fully understand the additional benefits that can be realised.

A critical element of being able to move to a feasible AMI metering solution is not only the implementation of upfront infrastructure to enable meter data transfer remotely, but also the development of a robust Meter Data Management System (MDMS). Given the capability of AMI meters being able to provide frequent reads, the MDMS will need to be fit for purpose by being able to store and effectively process millions of reads per day which will be a significant shift to how many reads we currently collect and process data for billing and operational processes.

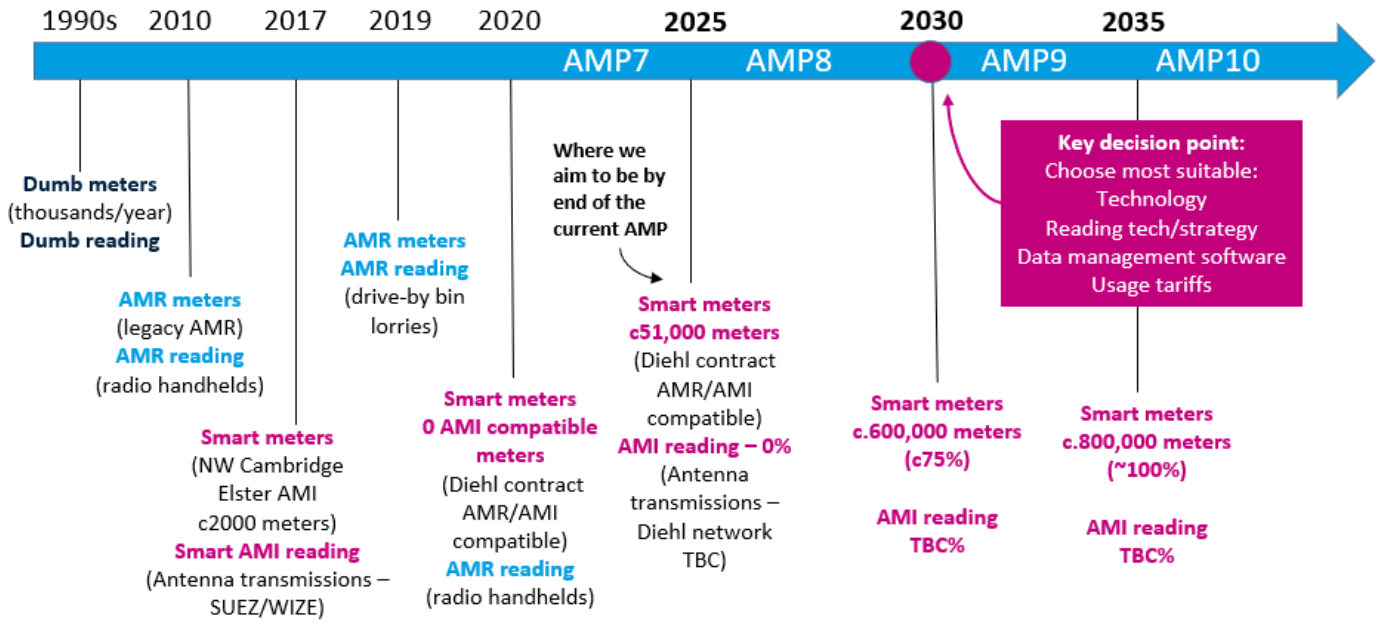
Figure 18 below shows AMR rollout run rates and why different pathways were excluded to ensure we maximise benefits as early as possible to meet interim targets and our 2050 ambition.

Figure 18: Metering rollout run rates



However, we do expect costs and technology maturity to change over the lifetime of our plan, and therefore are proposing to install AMR meters that are easily adaptable to be converted to AMI meters. We expect this shift to occur during AMP9 and beyond informed by our monitoring activities, and this is reflected in the split of meter installs we're proposing building from our metering installation journey as shown below in figure 19.

Figure 19: Our metering journey and future look ahead towards full metering coverage



AMP8 Monitoring activities – Key enablers to inform our strategy for AMP9 and beyond:

- **Phased roll out of AMI technology** – testing different networks and conducting pilot studies to further understand and learn the additional benefits to PCC/Leakage realised from granular data.
- **Testing Meter Data Management Systems (MDMS)** – currently using a meter portal that links to our billing system – there are many different options/systems to explore and how we use data for multiple purposes.
- **Meter reading efficiency –** continue to explore bin lorries, company vehicles, other methods to increase efficiency and manage to mix of existing meter stock (i.e. dumb and legacy AMR meters).

Summarising why our metering strategy is the best approach:

- Our universal metering strategy is a cost-effective (**no /low regrets investment**) approach that maximises the benefits we can achieve before moving to a more advanced (AMI) and mature technology solution in future.
- We are installing AMR meters that are fully smart capable i.e. can easily switch to the AMI network without the need to replace the meter – **our option is flexible and keeps future options open** .
- Our strategy allows time to test and develop AMI solutions as the costs and technology changes over time to enable us to move to a more established and cost-effective solution – **minimising the cost of future options.**
- Our strategy focuses on maximising demand savings and meter reading efficiencies – industry studies have how shown moving unmetered households to meters on average delivers a saving of 13% reduction in demand.
- Our research shows our customers broadly support metering as the fairest way to charge for water – our engagement and research to date has also provided additional insight to help shape the best way to deploy metering – which is that customers support maximising saving opportunities whilst ensuring mitigations are in place to support vulnerable customers. Thus we have included a range of support measures including water efficiency advice, audits, and a two-year grace period before moving to a metered account to make the transition as easy as possible.

9. How we developed our core and alternative pathways

Our LTDS core and alternative pathways have been developed through adaptive planning principles and underpinned by several inputs and activities to determine a holistic and best possible strategy to deliver our long term outcomes for our customer and environment as efficiently as possible.

Our core and alternative pathways includes applying:

- A proportionate approach reflecting our key priorities in the most detail – with room to further develop in other areas
- Key strategic frameworks tools and outputs eg WRMP, WINEP programmes
- Establishing a set of principles and filtering criteria to validate options in the core pathway
- Best value optioneering and optimisation to support timing and phasing of investment, this includes applying (where possible for some areas) the 6 capitals framework which considers environmental and social impacts
- High-quality customer research and engagement informing key priorities and phasing of investment.

We undertook the following steps to develop this strategy.

1. Identify the core pathway

- Develop a package of no/low regret investments, including the investments required to keep future options open. This exposes the activities that should be carried out regardless of circumstances.
- The core pathway must meet short-term requirements, deliver best value, meet the outlined ambition and differ from our water resources management plans.

2. Scenario testing of the core pathway

- The core pathway must pass all benign scenarios and some high scenarios.
- Where the core pathway does not meet the high scenario, an alternative pathway is needed.
- Wider scenarios testing to meet company specific or local circumstances

3. Identifying the alternative pathway(s)

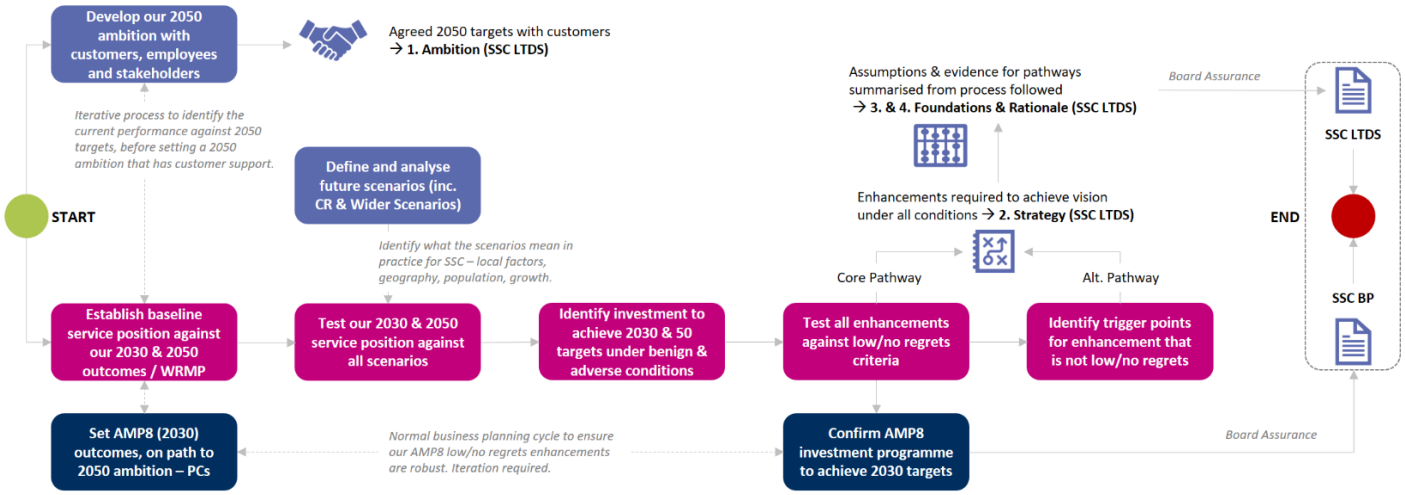
- Explain how the enhancement investment programme may need to change in future, in response to changes in circumstance.
- This includes identifying decisions or trigger points and actions we will take for each area of investment (where applicable) to meet the ambition under a range of plausible scenarios, showing when we will make additional investment and why.

4. Identifying monitoring activities

- To support the core and alternative pathways a monitoring plan will be developed tracking key activities and metrics to be able to adapt our core pathway in a timely and cost efficient way that minimises the cost of future options.
- This includes reassessing future long-term options as future uncertainties change or new information comes to light, for input into PR29 and beyond

The figure 20 provides an overview of the key steps in developing our LTDS strategy after we set our ambitions and targets to 2050.

Figure 20: Overview of the key steps to develop our LTDS strategy alongside our PR24 Business plan



Identifying and developing the core pathway

We considered which areas of our ambition are to be delivered through our base allowances. We then considered our current levels of service against the common scenarios, alignment with our WRMPs and the key areas of enhancement needed for the next 25 years. We are mindful that while AMP8 and AMP9 risks and required investment options are clear, AMP10 options are more challenging to determine and are dependent of a number of assumptions because the future is uncertain.

Through our WRMPs we have defined a no/low regrets investment plan to ensure we maintain our supply/demand balance across our Cambridge and South Staffs regions. We used multi-criteria analysis techniques to evidence the robustness of our plans to the climate change and growth scenarios. This identified the need for a strategic resource option for our Cambridge region, which we considered against the following to ensure it is the best no regrets solution.

- Modular solutions.
- Behavioural change.
- Operational solutions.
- Partnerships.

For enhancement schemes outside of our WRMPs, we have used a framework approach to test the following. Again, this has given us a no/low regrets plan.

- Benign and adverse scenarios.
- Plausible scenarios.
- Needed to meet short-term requirements.
- Keeps future options open.

Overview of the process for creating our core pathway

We began by creating an unconstrained list of investment options that will go into the core pathway. This starts with identifying the key areas of enhancement needed on top of base allowances for the next 25 years to deliver our statutory duties, strategic outcomes such as those described in our WRMP and WINEP, non-statutory requirements and any expenditure classified as enhancement based on the risk-based review of asset health, the LTDS Ambition and stakeholder engagement. We then develop a constrained list by going through a filtering/screening process of taking each activity in the "unconstrained list" and applying a set of filtering criteria (as per Ofwat's LTDS guidance) to each activity which included all possible enhancement schemes under a framework to develop no/low options in the first instance that supports long-term adaptive planning. All activities had to meet the following criteria:

- 'no regret' investments (that are likely to deliver outcomes efficiently under all plausible scenarios) and/or 'low regrets' investments (that are likely to deliver outcomes efficiently under a wide range of plausible scenarios), for example investments that are required:
- in both benign and adverse scenarios;
- across a wide range of plausible scenarios; or
- need to be undertaken to meet short-term requirements; and

- investment required to keep future options open (such as enabling work or learning and monitoring), where possible, or is required to minimise the cost of future options.

Taking the constrained feasible list, we determine the least cost draft core pathway (this includes a full appraisal of options such as existing resources and potential new resources as well as demand management options) to produce a least cost solution). We then tested the least cost solution against a number of criteria that are relevant to achieving the outcomes of the LTDS Ambition and ensure it is the best no regrets solution. This includes:

- Optimisation tools such as a multi-criteria analysis (MCA) tool, Asset management models, and value stream (a tool that generates the best value outcomes based on certain criteria)
- Decision framework developed tool to evidence preferences arising from customer and stakeholder engagement activity including willingness to pay research to validate or inform priorities and phasing of investment options (ref LTDS customer triangulation work)
- Any regional or environmental criteria over and above that included in WRMP and WINEP

From this analysis we were able to develop the most efficient package of investments that will meet all plausible scenarios to achieve the LTDS ambition outcomes and thus was selected as our draft core pathway that will be used for scenario testing.

Figure 21: Key steps to developing our core pathway

We are mindful that while AMP8 and AMP9 risks and required investment options are clear, AMP10 options are more challenging to determine and are dependent of several assumptions because the future is uncertain. Therefore it is important to note in applying this framework some of the elements of the LTDS when considering the longer term were driven by data or extending models (e.g. resilience, interconnectors, raw water quality and supply and demand schemes from WRMP). However other areas of the LTDS where data was very limited and high level of uncertainty required us to make expert judgement supported by key activities, we need to monitor to enable us to understand future investment, this for example includes the need to investigate level of abstraction reduction requirements in AMP8 to inform the long-term requirements as part of our environmental destination journey.

Identifying and developing the alternative pathway(s):

Our Core pathway was tested against the Ofwat common reference scenarios to see if the enhancement investment programme needs to change in future, in response to changes in circumstances. For example, a change in enhancement expenditure may be required in response to different levels of climate change. The core pathway investment programme when tested showed the current set of options are able to meets all the benign common reference scenarios, and the faster reference scenario for technology and the high demand scenario (only for period 2025-2030). This is further shown in the common referencing testing later in this chapter.

Only two scenarios – the low technology scenario and high climate change scenario triggered the need for an alternative pathway. Large-scale supply schemes (such as Fens reservoir in the Cambridge region) are being considered within the regional water resource planning framework and reflected in WRMPs. Residual uncertainty of the delivery of Fens reservoir supply side is reflected in the narrative. The testing also identifies what we need to monitor, the trigger/decision points and additional spend to meet ambitions.

Across our investment areas our WRMP, resilience and water quality were the main areas susceptible to more adverse future scenarios compared to other areas and thus have triggered alternative investment pathways. Therefore, we have shown a more detailed description and methodology used in developing the core and alternative pathways for these areas of investment given the level of risk and impact to delivering our long-term outcomes and ambitions.

9.1 WRMP – Developing our core and alternative pathways

Through our WRMPs we have defined a no/low regrets investment plan to ensure we maintain our supply/demand balance across our Cambridge and South Staffs regions

We have also worked with key stakeholders and third parties to identify any new options and worked to develop these. We have used environmental assessments to identify the feasibility of options, as well as gaining customer feedback on preferences. Through our

pre-consultation on the plan in January 2022, we received feedback from the Environment Agency which led to several options being deemed no longer feasible due to changes in water availability in the waterbody impacted. Through the use of the multi-criteria analysis tool developed by Water Resources West (WRW), we have a consistent approach across the WRW water companies of assessing the value each option provides, in order to determine the best value plan for each company and the region as a whole.

Our WRMP preferred plan represents not only our most likely scenario but also our core as it includes low regrets options that allow for further feasibility in the future, should that come from worsening climate change or an increased environmental ambition as well ensuring we meet Water Resources planning guidelines.

Demand management options have been developed with the assistance of consultants Artesia. Artesia were asked to determine the optimal way of achieving the Environment Act targets, both from a cost and deliverability point of view. This then produced a profile of activities over the planning period. A range of scenarios for each option were looked at as part of the process that related to:

- PCC ambition e.g. 90 l/h/d, 110 l/h/d and 120 l/h/d
- Rate of pace of achieving universal metering e.g. 5 years, 10 years, 15 years or not at all, and the impact this had on delivering the targets and the cost of doing so.
- Rate of leakage reduction e.g. achieving 50% reduction target by 2050 or 2040

Supply options were developed with the assistance of consultants Atkins and through the regional planning groups. We reviewed the existing WRMP19 options and any new options identified. These options were costed, including with respect to carbon, and costs are provided at December 2020 baseline. In addition, external consultants (Ricardo) have undertaken environmental assessments for all our supply and demand management options.

Options development has followed a dual streamed process from unconstrained through to feasible where SEA has been carried out alongside options development.

- Identification of unconstrained options through brainstorming events including both internal expertise together with leading industry consultants
- Environment Agency involved in both demand management options and resources options identification
- Initial screening using criteria such as feasibility, etc
- Further review of screening following more detailed scheme description
- Environment Agency views sought on resources options; and
- SEA scoping occurring concurrently.

We also undertook extensive customer engagement as part of developing the WRMP and determined that customers are keen that we progress demand savings before exploring new supply options, and are in favour of all aspects of demand management including:

- leakage reduction
- metering
- education to help change behaviours.

Customers have not expressed a desire to improve levels of service and reduce the frequency of temporary use bans.

We have followed the Water Resource Planning Guidelines to develop our options.

In the past, we have followed the economics of balancing supply and demand (EBSD) approach to develop our preferred plan, which is a well-established framework and traditionally focused on monetisation and developing least cost portfolios to meeting supply and demand challenges. However, for the more challenging complex issues identified through the problem characterisation a more sophisticated approach to analysis is required.

At WRMP19 we worked with Arup and Hartley McMaster, our incumbent provider for asset management optimisation, and worked through the UKWIR guidance to develop our existing optimisation software, which follows EBSD for portfolio selection, and extended it to allow investment option performance against other objectives to be assessed and incorporated into the portfolio selection process using multi-criteria analysis (MCA) techniques. We have built on this approach and for WRMP24, we needed to ensure we take a Best Value Planning (BVP) approach to developing our preferred plan, as laid out in the Water Resource Planning Guidelines. As such WRW, and the water companies within it, commissioned HR Wallingford and PJM Economics to develop a multi-criteria analysis tool that would allow companies to assess the value of options, as well as then produce the best value plan to resolve the challenges in each company and the region overall. We have then utilised this tool for our Cambridge Water WRMP to ensure consistency in approach between the two plans.

A full appraisal of capex, life cycle costs and opex (totex) for all options ensures we can produce a least cost solution. The inclusion of other un-monetised attributes also allows us to optimise on other objectives and understand the value of differences.

The MCDA considers different types of metrics that are important in determining best value:

- Cost
- PWS drought resilience
- Carbon costs
- Flood risk
- Human and social wellbeing
- Sustainable natural resources
- PWS customer supply resilience
- Multi-abstractor benefits

These metrics are then weighted and scores for each area for each option are determined using the Valuestream1 tool following the input of SEA and NCA metrics. We then use these outputs in the Valuestream2 tool which looks at our supply and demand and determines the best value options to resolve the challenges we face. We have used this, and EBSD modelling, to develop our preferred plan, least cost plan and the plan that is best for the environment.

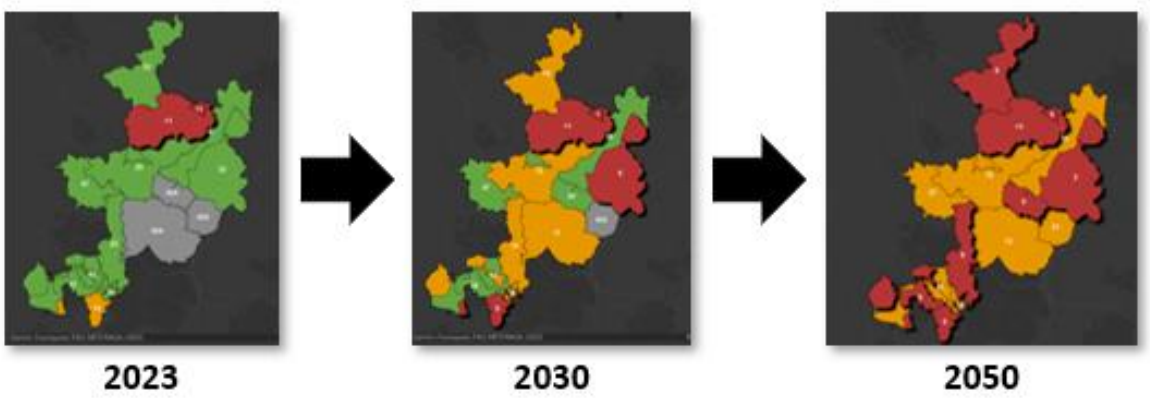
9.2 Resilience – Developing our core and alternative pathways

For PR24, we considered it critical to our business plan and LTDS to build a new resilience model for all supply zones in our network. We sought to develop a model that could assess the resilience of our supply zones to climate change, demand, operating environment, and reservoir level (asset health).

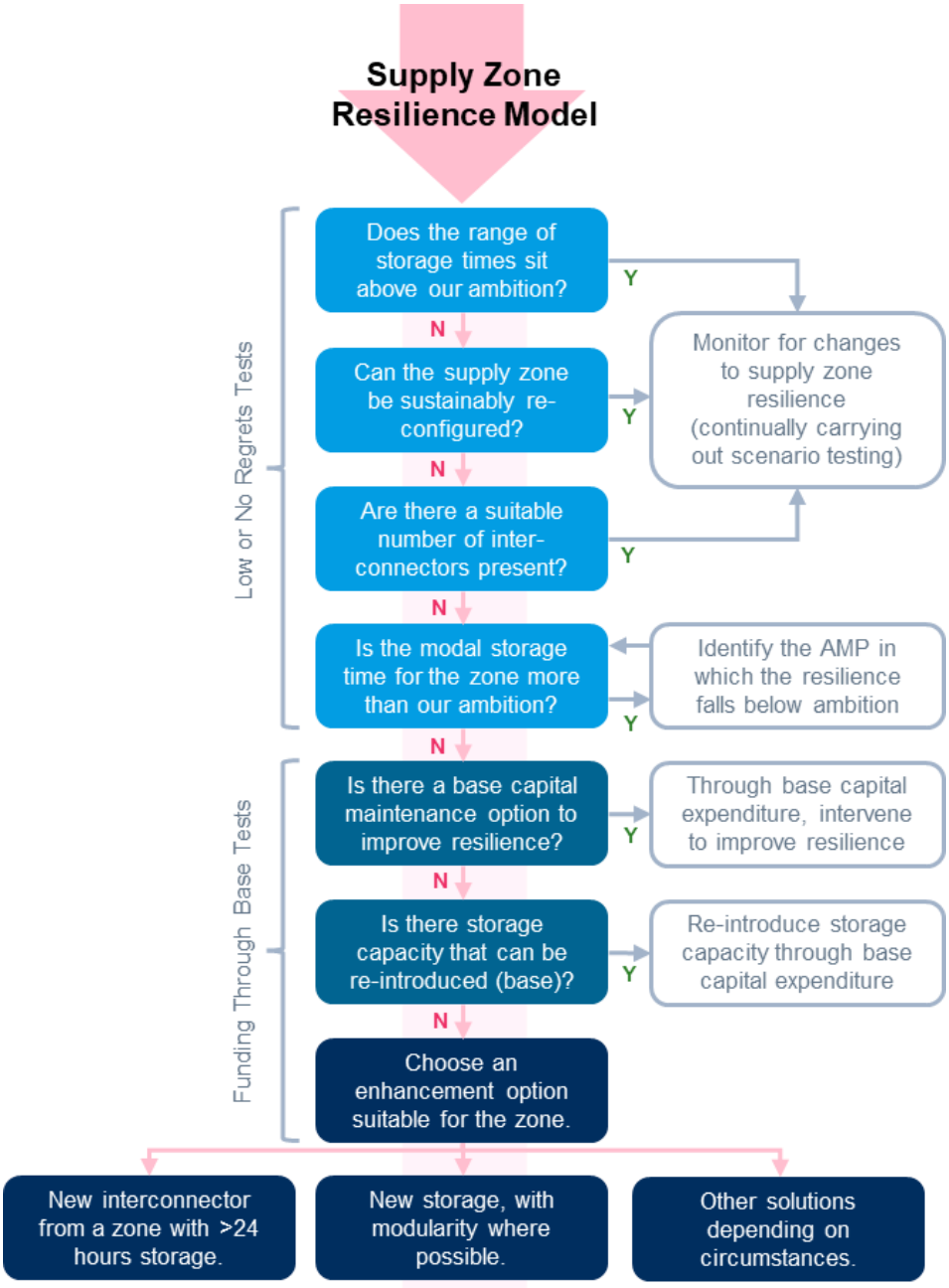
The model calculates a supply-demand position (in terms of hours of storage available) based on a wide range of operating scenarios (hydraulic constraints, network configuration, available sources etc.) and conditions. The review started with demand levels in 2023 and looked at the effects of projected demands into the future. The output for each supply zone always included the emergency storage times based on all supply input reducing to zero, and key assets being out of service. There were a series of operational scenarios defined for each supply zone from a least likely set of circumstances to a most likely set.

After running these scenarios over 25-year period, across all zones, with assumptions on available storage, we were able to produce a spatial representation of our storage position over time as shown in figure 22.

Figure 22: Potable water storage time in the Staffordshire region (do nothing scenario)



To identify our core pathway expenditure we followed the simple decision-making hierarchy as outlined in Figure 23 Supply zones that have a range of storage times lower than the 24-hour ambition are ones that we have targeted first, as part of our low or no regrets assessment.



9.2.1 Options development for LTDS

Our primary method for developing options for LTDS enhancement schemes was to use our people's extensive knowledge and experience of the network during zonal study workshops to develop a long-list and identify a preferred solution. This followed a structured process for all supply zones where resilience investment was required over the LTDS horizon:

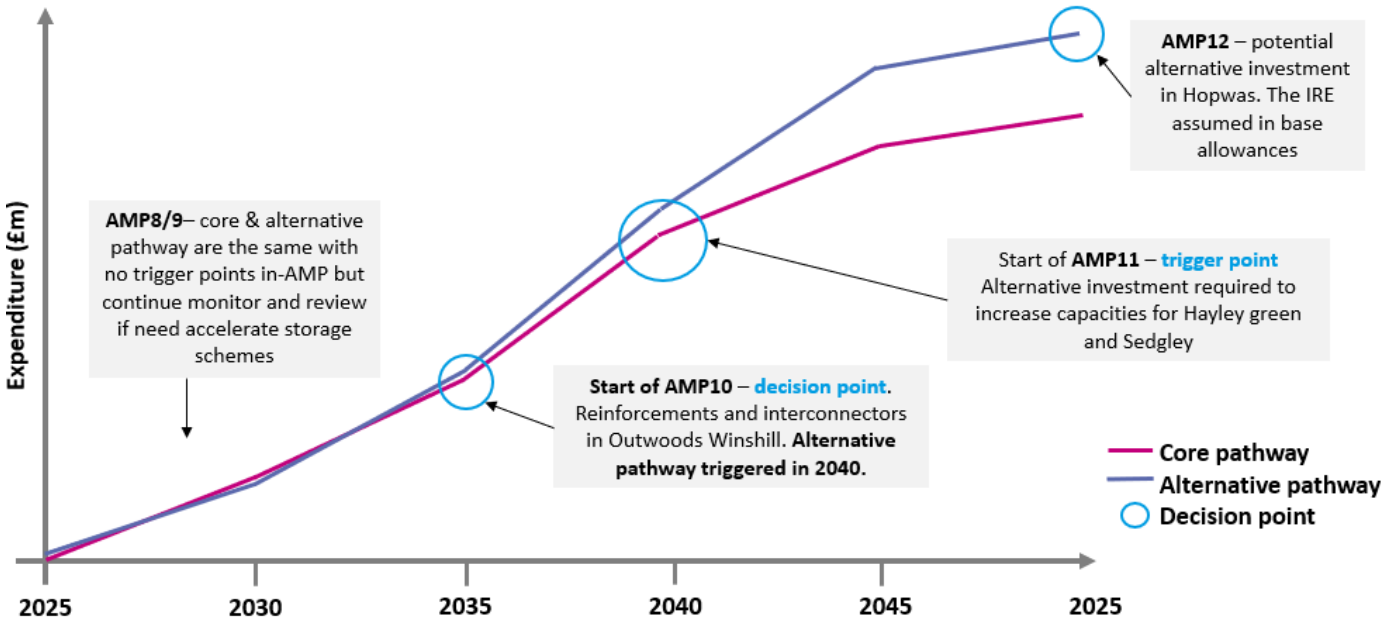
1. First, we followed the decision tree in figure 23 above to determine whether a base or enhancement option was recommended.
2. Second, for both routes (base and enhancement), we carefully analysed the configuration of the zone to determine a feasible list of options. This included assessing hydraulic constraints, areas of growth, and dependencies on other assets or zones.
3. Third, we identified an initial preferred solution based on the likelihood of each option delivering the desired step change in zonal resilience.
4. Finally, for the preferred solution, we further refined the option to explore innovative, alternative ways of delivering the scheme that supports adaptive planning (e.g. if a new storage asset is required – exploring the opportunity for modular storage rather than large new reservoirs).

Figure 23: Decision tree used to identify core pathway expenditure for Network Resilience

This is the same optioneering process as for our AMP8 schemes, though these were progressed further through rounds of long-listing and short-listing to pass additional gateways. Any further solutions or design principles that were identified for the AMP8 schemes were considered for the rest of the LTDS schemes as part of a review with stakeholders later in the process. Costs for LTDS schemes were derived from historic outturn costs in AMP7, fully costed schemes for AMP8, plus consideration of the network configuration within the zone. The nature of these schemes means that there are unique factors associated with each project – as a result, all projects were reviewed individually, and unique factors included within the costs (we estimate these costs to be +100%/-25% at this stage).

Applying the decision tree to all our supply zones helped us to generate our AMP8 business plan and LTDS core & alternative pathways for zonal resilience. The alternative pathway was triggered due to high climate change reference scenario with a key trigger point being 2040 as show in figure 24 below. The key indicators were sustained change in demand profile, longer periods of hot weather during low flow.

Figure 24: our core and alternative pathway for network resilience enhancement to 2050 with trigger/decision points



9.3 Water Quality – Developing our core and alternative pathways

Using the drinking water safety plan structure enabled us to ensure that the whole drinking water supply system was appraised in our long term planning. We were particularly careful to give the scope of catchment a thorough review, utilising an expert panel approach to challenge the boundaries of where catchment can effectively support in delivering our water quality ambition over the planning period.

Dependant on the needs being reviewed, we used a range of approaches to define our core pathway and evidence that the proposal was no/low regrets.

DWSP area	Method of assessing no/low regrets
Catchment	Expert Panel
Treatment	Raw water trend data, site outage data, expert water quality knowledge (supported by Atkins)
Distribution	Reservoir turn over analysis, asset data, mains deterioration models
Customer	Case studies

Each area of investment was assessed, primarily on data basis, where robust data was in place, but the use of expert panels was necessary, especially for some of the investment areas towards the end of the planning period. Our definition of no regrets was that it was needed to ensure we continued to meet our regulatory obligations.

9.3.1 Catchment

Our catchment plans were based on a desk top assessment, supported by an expert panel assessment. We have data to support the effectiveness of our existing catchment activities, and we made our benefits assessment by scaling these up. We believe that a catchment-based approach, building on the work we have done to date, is a vital way to ensure we are truly resilient to the shocks and stresses the future will bring, even before applying the climate common reference scenarios – as we are already experiencing the impacts of a more varied climate on our operations. We concluded that this activity was therefore no regrets.

9.3.2 Groundwater

We have a wealth of data for known groundwater contaminants and have trend data models which we use to derive approximate dates for when investment will be needed to ensure regulatory standards are maintained, for example, nitrate levels in raw water quality. We have reviewed this analysis with our drinking water safety plan teams, to ensure it aligns with our plans. We have also, as

per the guidance, excluded making any assessment on when new determinants may have regulation applied to them. We have also worked with Atkins to understand efficacy of our existing treatment process under a number of climate change scenarios, including the benign low change scenario.

9.3.3 Surface Water

For our exiting surface water treatment works we have worked with Atkins, together with our own in-house analysis to support the development of our core pathway. Our no regrets scenario for these assets is based on the treatment solutions we have installed this AMP are effective in delivering compliance.

In AMP9 our Cambridge region will for the first time in 170 years receive surface water. While this new water source will be compliant with all required regulations, we are acutely aware that the introduction of a surface water to customers who have historically received a groundwater derived source will require careful management and engagement on our part. In addition, the Grafham source utilises chloramination rather than free chlorine to safeguard water quality in the distribution system, which will require additional treatment to ensure these differing water sources are blended successfully.

9.3.4 Distribution

We have determined our core pathway for the distribution element of water quality through a number of ways. We are building on the knowledge gained during the current AMP, where we have successfully deployed smart network technology across a number of supply zones. We have worked with PA consulting to review the outputs of this work, combined with sector knowledge to support a wider role of not just smart technology, but predictive technology that can proactively calm the network in the event of changes. We believe that these benefits will continue, however until proven, we have only included a gradual ramp up over the next 25yrs, however we may speed this up when we have evidence to do so.

Under the benign climate change scenario, we still see temperatures increase over the planning period. We already see, and have data and models to prove, that our service reservoir's are challenged during warmer weather – both microbiologically and from a trihalomethane perspective. Under the benign climate change scenario we believe that it is likely we see additional failures, so we are proposing, starting in AMP 9, a programme of strategic enhancements. Thid programmes includes, improving reservoir turnover, redesigning inlet and outlet arrangements, optimisation of chlorine residual management across the network. Our core pathway sees us spread this activity over a number AMPs, phasing our South Staffs region first, as the exceptional quality of our current groundwater sources in Cambridge means this would not be required until at least AMP11. We haven't included this in our core pathway due to the uncertainty in this at this time.

We have developed a new predictive learning deterioration model for our infrastructure assets and have included a climate change scenarios to stress test the models outputs. To date, due to limitations within the dataset, we see little change in the modelled outputs when applying the climate change scenario, i.e. only marginal increases in mains renewals to meet deterioration, However, as part of our core pathway analysis we are confident that the increase in dataset will show, over time, that a greater increase in mains renewal is required. Our data does demonstrate that there is a string correlation between mains bursts and discolouration contacts from customers. Therefore, from AMP10, mains renewals for water quality purposes feature in our core pathway.

9.3.5 Customer

Our core pathway for the customer element includes adequate investment to maintain the ongoing Water Fittings Regulations enforcement programme and responding to risk from potable / grey / black water systems as no/low regrets expenditure.

The key assumptions for all the above investment areas and activities are outlined in the foundation chapter.

9.3.6 Developing alternative pathway

For the high climate change scenario our assessment concluded that, outside regulatory change, the biggest driver for uncertainty, where our core pathway is most likely to fail, is under the high climate change scenario. In this case our core pathway for surface water treatment requires additional investment.

We have worked with Atkins to understand how the impacts of climate change affect raw water quality, and at what point is our existing infrastructure no longer fit for purpose (trigger point) that requires intervention onto an alternative pathway.

Evidencing tipping points

The figures below show the timeline for River Blithe & Blithfield Reservoir and when and alternative pathway is triggered.

In summary the graphs in figure 25 and 26 shows the:

1. Most likely 'tipping point' for change – 2035 to 2040 –related primarily to low flows
2. Second tipping point for much lower flows 205- to 2060
3. In this case storage investment plays bigger role because of size of reservoir

Figure 25 :Number of days a year with flows in the River Severn > 400 Ml/day, the flow above which water quality constraints are likely to come in

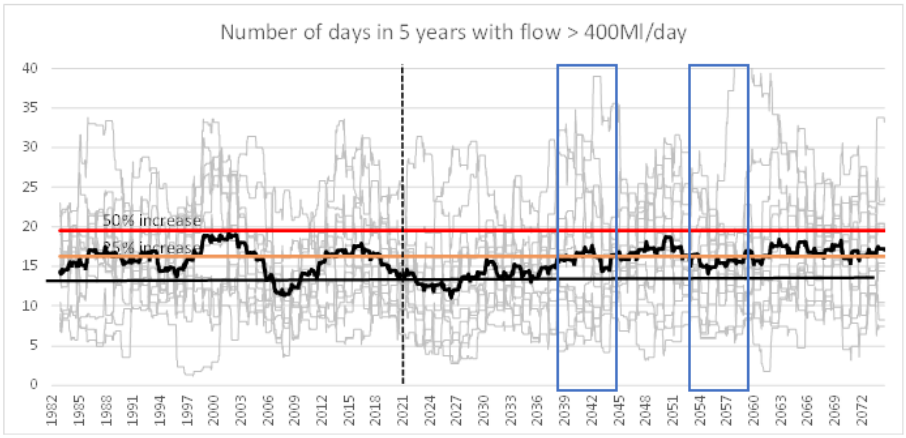
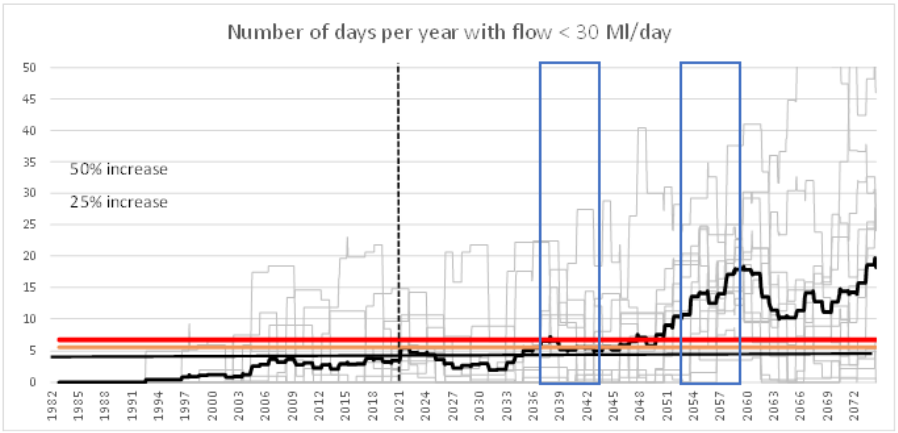


Figure 26: The number of days a year with flows in the River Severn < 30 Ml/day, the flow below which abstraction is reduced



10. Common reference scenarios testing

Stress testing the core pathway forms a key part of adaptive planning to ensure our investment strategy contains the necessary activities to deliver our long-term targets and ambitions efficiently and under a range of plausible scenarios.

To ensure our core pathway is robust and able to meet all plausible scenarios, we tested our strategy against Ofwat's common reference scenarios to see where the pathway may need to adapt (which may include feasibility studies or enabling works) and where an alternative investment pathway is triggered under a certain scenario. It also highlights key areas that need to be closely monitored to adapt or inform a future decision.

The core pathway design includes options as low or no regrets which showed to meets all the benign common reference scenarios, and the faster reference scenario for technology and the high demand scenario (for the period 2025-2030). A summary of the Ofwat common reference scenarios impact on our core pathway is shown in table 15 below for each scenario:

Table 15: Summary of the common reference scenarios testing and impact to core pathway

	High / 'Adverse' Scenario	Low / 'Benign' Scenario
Impact to core pathway	**Climate Change**	
	Yes – Alternative pathway triggered. Additional resilience and water quality investment required e.g. storage/treatment	**None**
	Technology	
	None	**Yes –** Alternative pathway triggered. Additional demand management investment required e.g. water efficiency schemes
	Demand	
	None **Except**	**None**
	Abstraction reductions	
	None	**None**
	Wider scenarios	
	Affordability – due to the changing nature of affordability and unique position of the uncertainty of the delivery of Fenlands reservoir in Cambridge and the associated levels of bill impact a scenario test with key tiggers/decision points in time was not possible to show at this time. However, this will be a key monitoring area given the challenges in our South Staffs supply region and as we gain more certainty of delivery of Fenlands reservoir we will track, and monitor levels of water poverty in our supply area and will adapt our affordability strategy accordingly.	

The table above shows the investment areas that triggered alternative pathway investment include WRMP, Resilience and Leakage. The changes to spend associated with all of these scenarios, are shown in table LS5 in appendix:'SSC04 Data tables submission'

Testing key investment areas against common reference scenario

WRMP

Our WRMP preferred plan represents not only our most likely scenario but also our core as it includes low regrets options that allow for further feasibility in the future and is required to ensure it meets Water Resources Planning guidelines.

We have tested both our WRMP plans for Cambridge and South Staffs against different common reference scenarios to see impact to enhancement programme. All scenarios tested are the same as our WRMP preferred plans apart from high demand and low tech. A summary of the impact of scenario testing on our WMRP is shown in Table 16 below:

Table 16: Impacts of scenario testing on WRMP

Common Reference Scenario	Impact on WRMP Plan
Climate change	the impact of climate change on our water resource zones is small and does not make a material impact on our supply demand balance. As such, it does not impact on either our demand management or supply side options required and so there is no change to cost of our plan compared to that presented in our WRMPs
Abstraction reductions	For our Cambridge region, there is little difference in the level of abstraction reductions for both low and high scenarios. Therefore changing these scenarios does not alter the options selected in our plan or the timing of them. For the South Staffs region, we have the available headroom to adopt the high environmental destination scenario without the need for any new supply options. A lower level of environmental destination does not reduce the cost of our plan as it contains demand management alone, and the level of this is required to meet the Environment Act targets and so cannot be reduced
Technology	Our WRMP for both regions are aligned to the high technology scenario, however the low scenario impacts the cost of our demand management programme as a result. It does not alter spend associated with supply side options in Cambridge as this is driven by abstraction licence reductions. However, our demand management plans are built to deliver the Environment Act targets, and once smart metering is in place the plan is able to select more cost efficient options to deliver both leakage and water efficiency reductions e.g. innovative tariffs, more efficient leakage detection etc. By delaying the implementation of smart metering and therefore the data we would receive from this, we need to utilise less cost efficient options for longer in our plan to ensure we meet the Environment Act targets. As a result the low technology programme costs an additional circa £15m compared to our core pathway investment programme (all costs are shown for the low technology scenario are shown in table LS3b in appendix: 'SSC04 Data tables submission')
Demand	The impact of different growth projections is the key factor for this scenario. Low demand does not impact on our preferred plan for Cambridge region as the supply side options in the plan are needed to achieve the abstraction reductions needed to meet environmental needs rather than to meet increases in demand for growth. Our demand management programme offsets planned growth and ensures the delivery of the Environment Act targets, and therefore cannot be slowed down. For South Staffs, there are only demand management activities in the plan and they are required at the level included in the preferred plan in order to deliver the Environment Act targets. Therefore, even with lower growth, the profile of this activity and the spend associated with it cannot be slowed or reduced otherwise we are unable to hit the targets. For our South Staffs region, these scenarios do not alter the preferred plan For Cambridge we further tested the plan against the recent Government announcement which looks at potentially 250,000 new houses. As a result, the timing changes for some of our supply side options as it looks to bring these forward to support the increase in demand associated with this growth. However, whilst these change the dates of some of the options, which will impact the costs in those AMP periods, the overall cost of the plan is the same as is the options selected.

Environment - WINEP

The WINEP programme is developed every five years in order to enable adaptation to changing regulation, needs and requirements, particularly around climate change. Despite this short-term programme, we have identified those areas that will continue beyond AMP8, as we have detailed above, although this is difficult to fully scope and cost at this stage due to the changing drivers for the WINEP programme which are identified by the Environment Agency.

As such, it is difficult to outline alternative programmes at this stage should any future scenarios come to pass. However, we have identified potential impact on the future delivery of the programme by testing the key areas against the Ofwat common reference scenarios and identifying a level of risk associated with these, as detailed in the Table 17 below:

Table 17: WINEP risk to delivery tested against Ofwat's common reference scenarios

Scenario		Risk level	Impact on WINEP	Comments
Climate Change	High			Would increase cost of WINEP scheme as additional actions required to mitigate climate change.
	Low			Unlikely to impact costs significantly
Technology	High			Little impact on Environment programme
	Low			Potential additional work required on carbon reduction
Abstraction reductions	High			There is little difference between low and high ambition for our areas, therefore little impact likely if ambition level changes
	Low			There is little difference between low and high ambition for our areas, therefore little impact likely if ambition level changes
Demand	High			Higher demand may change environmental activities
	Low			Lower demand would be unlikely to change environmental activities

Risk		Low likelihood of occurrence
		High likelihood of occurrence
Impact		Low impact on WINEP programme deliverables and cost
		Medium impact on WINEP programme deliverables and cost
		High impact on WINEP programme deliverables and cost

These scenarios will be monitored as part of the WRMP process and through the WINEP development for AMP9 and beyond, and the programme will be developed accordingly.

Net Zero

It is difficult to outline emerging alternative technologies at this stage, however, we have identified potential impact and risk on the future delivery of the programme by testing the key areas against the scenarios and identifying a level of risk associated with these, as detailed in the table 18 below. Measuring and monitoring is undertaken through UKWIR carbon workbook audited externally.

Table 18: Net zero risk to delivery tested against Ofwat's common reference scenarios

Scenario		Risk level	Impact on Net zero	Comments
Climate Change	High			Baseline kW usage during extreme drought conditions would need to be mitigated.
	Low			Unlikely to impact performance or cost.
Technology	High			Adopting new technology may impact additional forecasted cost assumptions.
	Low			In-line with current plan.
Abstraction reductions	High			Deviation from 2050 deadline will impact investment and program.
	Low			Little impact unlikely if ambition level changes.
Demand	High			Higher demand than forecasted could increase energy consumption.
	Low			Lower demand than forecasted would benefit energy consumption and accelerate the glide path.

Water Quality

Our analysis of the 4 areas of water quality planning tested against Ofwat's common reference scenarios have concluded that, outside regulatory change, the biggest driver for uncertainty, where our core pathway is most likely to fail, is under the high climate change scenario. In this case our core pathway for surface water treatment fails. We have worked with Atkins to understand how the impacts of climate change affect raw water quality, and at what point is our existing infrastructure no longer fit for purpose as we described in earlier in the rationale chapter. For more detail can refer to appendix: 'SSC32 Long-Term Delivery Strategy climate change impacts on raw water quality technical report'.

Resilience

Our ambition for production resilience focuses on ensuring our water treatment works and source stations can continue to supply water reliably. Although reliability can be measured in different ways, it aligns closest with the unplanned outage Performance Commitment (PC), defined by Ofwat. SSC currently achieves Upper Quartile (UQ) performance for unplanned outage and it is our ambition to at least maintain this level of performance for the next 25 years, as set out in table LS1 in appendix: 'SSC04 Data tables submission'.

Other than raw water availability and quality, the main threats to achieving this ambition were tested against the common reference scenarios specified by Ofwat, described Table X. We assessed these based on a high, medium and low impact, utilising data and models where this was available to us. We also assessed previous incidents and events to identify the root cause of unplanned failures at our production sites. In turn this allowed us to attribute these to an internal, or external factor.

Table 19: threats to achieving our production resilience ambition and the impact of Ofwat's common reference scenarios

Threat / Scenario	Climate Change	Demand	Abstraction	Technology
3rd party power asset failure	**High** (Grid reliability in extreme weather)	**Low**	**Low**	**Medium** (Development of alternative energy infrastructure)
Increasing process complexity	**High** (Raw water deterioration driving increased complexity on site)	**Low**	**High** (Switching water source requiring different treatment)	**Medium** (Development of alternative treatment technology)
Alternative supplies (standby processes)	**High** (New supplies driving increased complexity on site)	**Low**	**Low**	**Low**

Lead

Our existing levels of investment are safeguarding water compliance and allowing us to remain within our CRI dead band. Our proposed future investment in the next AMP and beyond will allow us to continue this.

Alternative pathways would see us essentially do the same work sooner, however as we do not believe this is likely, we have not fully costed for planned this. Therefore we do not anticipate that any of the Ofwat threats or scenarios challenge our lead investment case.

Cyber and SSEMD

The pace at which cyber security moves makes it difficult, if not impossible to make long term predictions in terms of investment plans. Our AMP8 plan is based on our current assessment of risk, existing regulatory drivers and current government and industry guidance.

Looking beyond AMP8, and to an extent within AMP8, it is difficult to outline alternative plans should any future Ofwat scenarios come to pass. However, we have considered potential impact on our cyber security LTDS against the Ofwat common reference scenarios and associated a level of risk and impact to each.

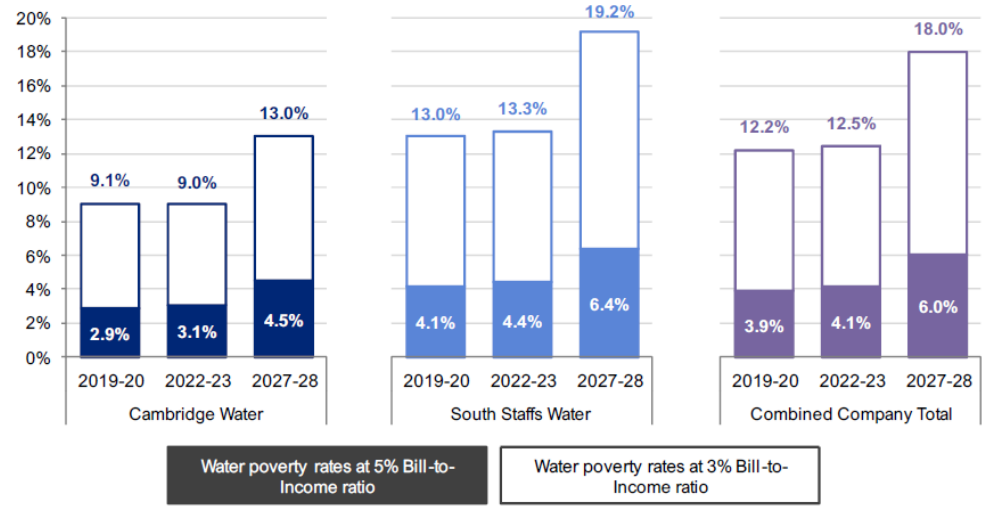
Wider scenario testing: Affordability

We recognise testing a wider scenario should be based on measurable factors with clear and observable metrics that can be used to define decision and trigger points. However due to the changing nature of affordability and our current unique position of the uncertainty of the delivery of Fenlands reservoir and the associated levels of bill impact, we do not believe this can be tracked rigorously as an alternative pathway at this time. However, supporting customers is at the heart of our plans, and so a key metric we will track, and monitor will be levels of water poverty in our supply area and will adapt our affordability strategy accordingly.

We want to ensure that our customers' water bills are affordable, both now and in the future. We recognise the importance of tracking a number of programmes during AMP8 to closely monitor any associated bill impacts. For example, although the financial mechanism to deliver Fenlands reservoir is yet to be confirmed, we recognise the potential bill impact the work on our Fens reservoir could bring. Hence our AMP8/9 plans ensure includes enabling work and ensures we gear up for the challenges whilst tracking continuously our customers' ability to pay alongside innovation and technology developments.

Our ambition is to eradicate water poverty by 2050, by innovating to exceed customer expectations and make sure help is always available. We have worked with CEPA to understand both our current and future predicted levels of water poverty, via detailed analysis based on current bills and incomes, and based on bills and incomes in the future (see figure 27). At a 5% bill-to-income ratio threshold, social tariff support is estimated to have reduced water poverty by approximately 30% in 2022/23 and is estimated to reduce water poverty by a similar proportion in 2027/28.

Figure 27: Estimates of water poverty based on existing social tariff interventions



Source: CEPA analysis of South Staffs Water data

Our PR24 business plan places affordability at the heart of our strategy, both with a sole focus and also alongside vulnerability via our new 'Help When You Need It' programme. We have aligned our approach with CCW's 'Independent Review of Affordability' and have several key strands that will support our target to eradicate water poverty by 2050.

We will commit to a 'wider than water' approach, linking in with third parties and local organisations to ensure customers are supported holistically. We will also introduce a 'pay in your own way' approach, continually introducing new payment methods, ensuring customers can pay at a time that suits them, and the option to spread cost over twelve months to suit individual circumstances. To give customers more choice in how they interact with us, we are investing in a fully integrated 'one platform' technology that will transform our approach to providing what we are calling our '360° view of the customer'.

Whilst customers will be able to self-serve via multiple channels, we recognise the levels of digital deprivation in our regions, so we will also be bolstering our community presence to ensure customers can engage with us face to face if they choose to. This continued investment both in our digital and community services will begin during AMP8 and continue into the future, reaching 2050. We are also committed to maintaining an accurate view of void properties across our region, aligning to ONS data which suggests a 2.6% void rate which we will sustain both across AMP8 and into 2050.

To further support our ambition to end water poverty by 2050, we will trial and embed a new innovative tariff. The tariff will be based on the number of occupants in a property and will offer discounts for water use of 110 l/p/d, with standard charges applying for discretionary use above this. Customers on the tariff will also be supported with additional water efficiency advice and devices.

Due to the naturally changing nature of affordability and the associated levels of uncertainty, we do not believe this can be tracked rigorously as an alternative pathway. However, supporting customers is at the heart of our plans, so we will track water poverty levels closely, and review and adapt our affordability strategy to align with both up to date data and insight from organisations such as CCW.

To make our ambition of ending water poverty achievable, we will work with third party organisations on an ongoing basis to track predicted water poverty levels across our regions both against the 3% and 5% thresholds. We will also create a new internal metric that surveys all PSR customers, inclusive of those registered with financial vulnerability, to ensure our plans are fit for purpose and providing appropriate levels of support. Using these combined statistics of predicted water poverty levels and impact of support with customers on our PSR register, we will assess whether our current affordability measures are supporting our ambition to eradicate water poverty by 2050.

If the data indicates that water poverty levels have increased above the levels, we track against to meet our ambition, we take action to seek additional contributions and adapt our approach to ensure we are supporting the customers that need us most. We will continue to work with third parties during AMP8 to firm up a continued understanding of how these levels are changing and will use these facts to shape our plans into AMP9 and beyond.








Part 5: Foundation – the assumptions that underpin our strategy

11. The assumptions and uncertainties behind our strategy

As a long-term business we plan for the future, but when looking so far ahead it comes with increasing uncertainty on what activities we may need to do and why. We recognise that while AMP8 and AMP9 risks and required investment activities are clear, AMP10 and beyond are more challenging to determine what constitutes no/low regrets investment as will be dependent on several assumptions including socioeconomic factors, Government and regulatory policy, condition of the natural environment, consumer behaviour and attitudes, asset health and the pace of innovation – all these factors and the change we have witnessed in recent decades makes the future even more uncertain.

Recognising the uncertainty the future brings, we have therefore been able to assess some of the elements of the LTDS when considering the longer term through data driven tools or extending models (e.g. resilience, interconnectors, raw water quality and supply and demand schemes from WRMP). However other areas of the LTDS where data was very limited and where there is a high level of uncertainty which we cannot meaningfully alleviate through alternative pathways or wider scenarios, required us to make expert judgement supported by key activities to appropriately account for the uncertainty. These activities include key areas we need to monitor to enable us to understand the future investment requirement. An example of this is the need to investigate level of abstraction reduction requirements in AMP8 to inform the long-term requirements that will make a difference as part of our environmental destination journey.

The foundation to our strategy will be following these key attributes to help deliver our ambition and long-term outcomes:

- Our people – in line with achieving our business ambition we will need to make sure that our people have the skills needed to deliver our long-term ambitions. We are committed to running an efficient, sustainable business where our people are empowered to make decisions and where they possess the skills necessary to realise our long-term goals. Each member of our team, whether in the field, our offices or our contact centre, plays a crucial role in bringing our long-term plan to life. Their dedication and hard work are integral to securing a sustainable water future for all of us.

- Partnership working – Looking ahead, we want to be a sustainable business that always delivers value for money for our customers – and long-term value for society and the environment. Key to this is working in partnership with a range of stakeholders and communities to make sure we generate positive impacts for local communities and ensure we leave the environment in a better state for future generations.

- Collaboration and open data – fostering a culture of collaboration both internally and externally will play a key part in achieving our long-term outcomes. From working across different teams and functions and collaborating and sharing insight with the wider water sector and stakeholder groups and experts through better open data approaches can untap cost efficiencies and ample opportunities. We are currently part of a number of collaborative industry working groups such as SPRING, Water efficiency steering group, UKWIR research programmes and Water UK.

- Innovation – innovation is key to achieving our long-term stretching targets by testing and discovering new solutions to sourcing funds from innovation competitions and other third parties will require a strong culture of innovation within our everyday business-as-usual activities. This will be essential for delivering the improvements our customers expect and are willing to pay for and to meet growing expectations with new technological advancements such AI and machine learning…etc.

11.1 Key assumptions across our investment areas

We have assumed we will deliver our performance commitments through a combination of both base and enhancement expenditure. Within base expenditure we assume there are efficiency and productivity improvements over time – either through direct cost efficiencies or from improving our performance and delivering more for the same cost. Enhancement is also required to deliver long term step changes and continuous improvements over time across the different investment areas.

With the high levels of uncertainty looking so far ahead, it will certainly require making assumptions which form a key basis to developing out investment strategies longer term. A summary of the key assumption across all our investment areas in our core pathways is summarised in Table 20 below:

Water Quality Assumptions

Table 20 provides key assumption under the respect DWSP investment area

DWSP Area	Key Assumptions
Catchment	We have used the benign climate change scenario – i.e no regrets even under this low change scenario No new regulatory changes are included for in this analysis
Treatment (ground water)	Historic trend data has been extrapolated; we assume not significant movement from this (without planned intervention) No new regulatory changes are included for in this analysis We have used the benign climate change scenario – i.e no regrets even under this low change scenario
Treatment (surface water)	We are assuming that investment made this AMP at HLTW and SMTW is effective in managing organics, enough to offset any increases that we may see in the benign climate change scenario We have assumed no increases in days where we do not abstract from the River Severn due to water quality No new regulatory changes are included within this analysis We have assumed the Grafham surface water transfer coming into Cambridge in 2032, will be to a discrete area. However once water from Fens reservoir is supplying Cambridge we will need to blend it with ground water High level costings based on TR61
Distribution	No new regulatory changes are included within this analysis We have assumed the benefits of network calming continue We have assumed our infrastructure deterioration model will have a more positive correlation with temperature once there is more data included We have used the benign climate change scenario, and even under this low change scenario this investment is deemed as no regrets
Customer	Our core pathway for the customer element includes adequate investment to maintain the ongoing Water Fittings Regulations enforcement programme and responding to risk from potable / grey / black water systems as no/low regrets expenditure

Resilience assumptions

- A significant number of reservoirs are approaching end of life (e.g. Shavers, Springsmire, Glascote) – assuming for LTDS that these are refurbished and are not taken out of supply for more than is necessary. Additional allowances in base expenditure for large reservoirs likely required in AMP9.
- Where growth has been identified as the primary driver for low resilience in a supply zone, this has been excluded from the LTDS as these costs would be recovered through infrastructure charges/developers.
- Costs provided are in 22/23 price base, even for later AMPs. Detailed design hasn't taken place for LTDS schemes in AMP9 and beyond. Utilised outturn costs in AMP7 plus new estimates generated for AMP8 core pathway schemes.

Net zero assumptions

The foundation and methodology of the SSC LTDS NZ strategy, is based on analysis and assessment of the following areas:

- AMP 7 energy strategy, and outturn
- AMP8 PR24 submission
- Aqua Consulting Net Zero and energy strategy review inc. long- range scenarios (June 2023)
- PA Consulting energy strategy framework review (September 2023)
- Regulator (Ofwat, EA, other) guidance, consultations and PR determinations
- SSC Carbon Management Hierarchy
- Good practice benchmarking and replication

- Innovation – technology, commercial models and process
- Continuous assessment, measurement and review process i.e. PDCA

Key Assumptions:

- AMP8 PR24 enhancement (BTM PV 7.4MWp, £7.3M investment) is realised
- Corporate PPAs are permissible under location-based reporting
- Gas engine decommissioning by 2039
- Interim 2030 Operational NZ will not be achieved due to gas engine decommissioning delayed to AMP10
- All scope 3 emissions not currently captured or reported will be in place by start of AMP8

Cyber/SEMD Assumptions

- Change needed in technology, people and processes to detect and protect the essential service will be incremental rather than radical over the LTDS period.
- Funding needed for change to maintain a low or very low risk profile AMP on AMP stays broadly in line with the cyber security enhancement funding sought in AMP8.
- The likelihood and impact matrix used to calculate future risk remains broadly aligned to the current matrix over the LTDS period.
- In regards to SEMD we have given our investment has been relatively flat in recent AMPs we have assumed to continue throughout the period as no/low regrets expenditure.

11.2 Monitoring plan

Our long-term adaptive plans undoubtedly carry high levels of uncertainty and thus require continuous monitoring to ensure that the key activities and their relationships to informing the triggers and/or decision points for investment are clearly identified and tracked against a proposed metric(s) where possible or key activities that inform decision points. That way, timely and cost-efficient decisions can be made as we refresh and adapt our plan.

These key activities are captured in our monitoring plan. Our monitoring plan allows us to objectively assess which of the potential futures will be realised and monitor key activities and metrics that will provide information to inform when we have reached a decision point to adapt our plan and invest in the right investment options at the right time. The Table 21 below shows our key monitoring plan areas, activities/metrics we will track and timing on when it will inform our LTDS strategy.

Table 21: Key monitoring plan areas, activities and metrics

Monitoring area	Key activities / Metrics	Timing
WINEP / Environmental Destination Investigations	We will undertake extensive investigations during AMP8 to understand the true nature of the abstraction reductions required to achieve the required environmental destination. This will involve working with Severn Trent Water, as we share catchments, to understand the specific needs of particular waterbodies and determine the priority and scale of reductions required.	During or by the end of AMP8 we will be able to adapt our core plan to deliver the scale of reductions required and bring schemes forward where scope to do so.
Environmental Destination Improvements (including Chalk streams health)	we are keen to ensure we take positive action to contribute to the environmental destination in the short term, so we do not wait until the outcome of the investigations to make positive environmental improvements. Through our catchment prioritisation work undertake through the WRW environmental destination workstream we have identified some short-term measures we could support, such as hydro morphological changes or fish passes.	We will review annually measures we have implemented through AMP8 and working with regional partners ensure deliver a no/low regret activities when future requirements are clearer.
Catchment management programme	Catchment management programme has formed a large part of our WINEP programme. For AMP8, this work now moves into our BAU activity and will be included in our PR24 business plan. We propose to continue our efforts in our region to deliver improvements to groundwater quality at source. Our Spring programme, working with local farmers and landowners, has seen significant success in reducing nitrates and metaldehyde, and we plan to expand both the	Reviewed annually and assess impact on the need for future water quality investments identified in our core/alternative investment pathways.

	area we cover with this scheme, but also the range of pollutants we tackle. This will help deliver improved raw water quality which will ensure we are able to maximise our existing raw water resources.	
25-year environment plan	We are also looking to develop a 25-year environment plan over the next couple of years that will align with the Government 25-year environment plan and will provide a clear line of sight for the environmental protection and improvements we wish to deliver over the lifespan of this WRMP. Our plan also looks at supporting other key areas such as delivering biodiversity improvements, supporting removal of invasive species such as mink, the protection of species and river restoration work.	Reviewed annually as part of our WRMP review
WRMP - Demand management	Demand management is the bedrock of our plans and therefore, it is critical that we have a robust process for the delivery of the various activities, as well as the monitoring and reporting of our performance so we can adapt our strategy. Key areas of monitoring will be the performance and effectiveness of activities such as smart metering, leakage improvements, behaviour change programmes, government water labelling initiative and innovation opportunities across the sector including the new water efficiency fund.	We have several mechanisms for monitoring our performance this includes annual reviews, quarterly reviews of PCs and monthly steering group. This is detailed in our WRMPs in appendix: 'SSC34 South Staffs Water revised draft WRMP24 and SSC35 Cambridge Water revised Draft WRMP24'
Water Quality	Monitoring the impact of water quality trends and emerging requirements. Developing cost confidence of different solutions to mitigate impact of climate change.	Annually and as and when needed for new regulatory drivers or standards.
Lead	Monitor water quality compliance – lead is part of the CRI measure Regulatory change in standard – would come via the DWI and consultation	End of AMP8 trials outcomes to inform future strategy and ensure adapt to no/low regrets investment as and when needed for new regulatory drivers or standards.
Net Zero	As our core pathway is expected to deliver the operational net zero target by 2040 as no/low regrets we will monitor a number of areas if we are able to bring forward switching off our gas engine where is cost benefit to do so and adapt our strategy. This includes: • Market conditions (energy and renewables) • DNO and ESO capacity, capability and investment • In AMP and previous AMP achievement against plan • Affordability • Regulatory landscape including changes since last AMP • Technology landscape inc. emerging solutions Innovation • Customer expectations e.g. Net Zero Citizens Jury	Reviewed annually and end of AMP8
Resilience	We will monitor the needs for Cambridge region as certainty increases around future raw water sources in the region and Fenlands Reservoir e.g. where water is entering the network and option require for network redesign or treatment…etc) This will enable us to provide a clearer no/low regrets investment plan for network design and resilience. This includes continuing to model and monitor the impact of changing demand profiles and if leads to further storage requirements.	End of AMP8 as have more certainty with the delivery and design of supply side options in Cambridge.
Cyber/SEMD	For cyber we will maintain and monitor a cyber risk register at least monthly, to ensure our risk profile remains on track to achieve a low to very low score throughout the LTDS period.	Cyber - The board will be updated on progress on a quarterly basis as a minimum. Annual SEMD audit

	For SEMD we will monitor the performance of security systems such as alarms, cameras etc. As well as risk assessments of sites such as change in criminality.	These reviews will help us to adapt and our key investment activities.
Affordability (Water Poverty)	Water poverty metric against both the 3% and 5% thresholds, as supported by CEPA data. We will develop a plan extending to 2050 inclusive of a new 'help when you need it' programme, and a 'wider than water' approach to ensure holistic support and increased flexibility for customers around how to pay.	During or by the end of AMP8 we will be able to better understand situation and adapt plan to deliver and/or bring schemes forward where scope to do so

Conclusion

The fact that we have been supplying drinking water to the communities we serve for 170 years demonstrates the need for us to continue planning for the long term. History tells us that, despite our best forward planning, the unexpected does happen, and we need to remain resilient to the unexpected to ensure we continue to meet the needs of our customers.

This strategy and the framework that we have outlined in this document provides a robust vehicle for us to do just that – the near future is far more certain than the end of the planning period, but we have identified both our core and alternative adaptive plans, and critically the metrics we will keep under review to ensure we are aware of a change and a trigger to consider an alternative pathway.

In addition to this we will continue to identify partnership and collaborative opportunities to deliver benefits across our investment areas. We will continue to seek and support innovation to enable delivery, reduce the risk profile and deliver the benefits required more cost efficiently. We have already actively participated in the Ofwat innovation fund and have been successful in the last round on a bid that we led, which aims to supports both our demand management efforts and better understanding of our customers from diverse communities. We will continue to explore these opportunities and welcome the continuation of the Ofwat innovation fund and the new water efficiency fund to boost new approaches and opportunities to support our long-term plans.

We will formally review our long-term delivery strategy in the run up to each business plan as a key staging post that take into account new information or circumstances to refresh our strategy where needed. This ensures that we continue to make the right decisions in the long term that serve us well in delivering for our customers and the environment in the long term.







Part 6: Board assurance

12. Board assurance statement

Ofwat expects the introduction of long-term delivery strategies to provide an important and enduring framework for companies to embed a stronger long-term focus in their operations. This will require a cultural change at all levels of the business.

The Board should provide an assurance statement that explains how it has challenged and satisfied itself that the strategy:

- reflects a long-term vision and ambition that is shared by the Board and company management;
- is high quality, and represents the best possible strategy to efficiently deliver its stated long-term objectives, given future uncertainties;
- is based on adaptive planning principles;
- has been informed by customer engagement;
- has taken steps to secure long-term affordability and fairness between current and future customers; and
- will enable the company to meet its statutory and licence obligations, now and in the future.

The Board should provide evidence where it has challenged company management and an explanation of the process it has used to arrive at the view that its strategy is the best it can be. It is for companies and their Boards to determine how best to provide this assurance, including the role of external assurance. The Board has been on the journey over the last few years in challenging and developing our long term delivery strategy.

There have been multiple touch points and engagement with our Board on our long term planning. Board members and have challenged constructively and helped to shape our strategy from the outset. Board feedback and discussion has been integral to developing and setting our ambition and vision to 2050. There was a high degree of Board member involvement in online customer focus sessions which were designed to explore the views of both current and future billpayers. to The Board has also participated in deep dive sessions which covered in the process and methodology used to develop our core and alternative adaptive pathways and which gave members an insight into the uncertainties and risks that the business plan needs to address. It has heard directly from the external assurance providers providing which has helped it to provide invaluable independent feedback at all stages in the process in developing strategy so as to ensure that the strategy is the best it can be.

The box below sets out the primary multiple touchpoints and engagement sessions with our Board to develop the LTDS strategy through to sign off. There were also numerous less formal interactions with individual Board members which benefited from specific areas of their expertise.

Below sets out the multiple touchpoints and engagement sessions with our Board to develop the LTDS strategy through to sign off.

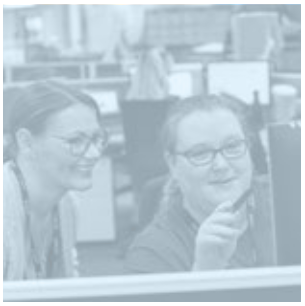
Long-term delivery strategy – evidence
Meetings
Adaptive planning approach in company WRMPs explained at multiple touch points.
Board strategy day, September 2022: ambition statements shared and agreed at Board strategy day.
Board meeting, November 2022: customer-facing consultation on the company's long-term vision ('Looking to the future') shared and signed off.
Business plan key messages and challenge points agreed for the meeting with Ofwat in February 2023.
LTDS customer engagement works scoped and key dates shared with Board.
Independent led LTDS customers focus groups observed by Board members.
In-depth stakeholder interview with Professor Ian Barker to shape the customer research programme.
Final LTDS core pathway shared with Board – demonstrating clear links with the company's regulatory commitments.
Evidence-based assessments for scenario testing of core pathway shared with Board.
Intergenerational fairness – presentation to Board of spend profiles and evidence of customer support.
Board meeting, June 2023: the core and alternative pathways shared and approved.
Board deep dive sessions on resilience and water quality climate change impacts and customer triangulation framework and decision tools.
Documentation
SSC32 Long-Term Delivery Strategy climate change impacts on raw water quality technical report

SSC33 Impact – SSC LTDS triangulation report
External assurance
PA Consulting: Operational resilience assessment, Cyber and wider. Atkins: Groundwater and surface water quality assessment to climate change impacts. Impact: LTDS Customer research triangulation and decision-making framework Jacobs: clear line of sight from the WRMPs to the LTDS and the business plan; ensuring enhancement business cases are consistent with 'no'/'low regrets' requirements; and a clear line of sight from the customer engagement. SIA Partners: evidence of engagement on the LTDS was found in 8 out of 15 research reports, indicating a substantial presence of coverage in the material provided. In addition, the LTDS was covered in real depth across the WRMPs, as well as the standalone LTDS research. "As a result, SSC has been awarded a score of (3) for this category." (Where 1 is the lowest score and 3 is the highest possible score.)







Part 7:
Other information

Glossary

Below, we define some of the terminology used throughout this long-term delivery strategy.

Adaptive planning. A package of planned investments over time. This long-term delivery strategy comprises a core adaptive pathway and two alternative adaptive pathways.

Adverse scenario. A scenario that describes a more demanding change in a material factor than expected. Meeting long-term objectives under this scenario may involve higher enhancement investment than under a benign scenario.

Alternative adaptive pathway. A package of investments that should be undertaken under certain circumstances. These circumstances are described by a trigger point (see below).

Base expenditure. Routine, year-on-year costs that we incur in the normal running of our business to provide a base level of good service to our customers and the environment, and to maintain the long-term capability of our assets.

Benign scenario. A scenario that describes a less demanding change in a material factor than expected. Meeting long-term objectives under this scenario may involve lower enhancement investment than under a benign scenario.

Common reference scenarios. Descriptions of the future to be used by all water companies to inform their long-term delivery strategies. The scenarios consider a range of benign and adverse assumptions around the future trajectories of: climate change; technology; demand; and abstraction reductions.

Core adaptive pathway. Or 'core pathway'. A package of no- and low-regret investments. The core pathway can include investment required to keep future options open, helping to identify the activities that should be undertaken regardless of circumstances.

Decision point. The point in time when a decision would need to be taken about whether an alternative adaptive pathway is followed. This is either set at the same point in time as the trigger point, or in advance.

Distribution input (DI). The volume of water entering a water supply distribution system at the point of production – that is, the sum of household and non-household water delivered (both measured and unmeasured), distribution losses and water that is taken but not billed for.

Enhancement expenditure: Investment designed to achieve a permanent increase or step change in the current level of service delivered to customers to a new 'base' level. Enhancement funding can be for environmental improvements required to meet new legal obligations, improving service quality and resilience, and providing new, resilient water supply solutions in drought conditions.

Low-regret investment: Investments that are likely to deliver outcomes efficiently under a wide range of plausible scenarios.

Multi-criteria analysis (MCA). is a form of appraisal that incorporate qualitative and quantitative appraisals of the investment options across a broad range of business objectives and able to assess and evaluate trade-offs between investment options across competing objectives in addition to monetary impacts

No-regret investment: Investments that are likely to deliver outcomes efficiently under all plausible scenarios.

Plausible scenario: A scenario that is possible, but not necessarily the most likely.

Scenario: A description of the future.

Trigger point: The point in time when a decision would need to be taken about whether an alternative adaptive pathway is followed. This is either set at the same point in time as the trigger point, or in advance.

Water resources management plan (WRMP). Sets out how water companies intend to achieve a secure water supply for customers and a protected and enhanced environment over a 25-year timeframe. Companies are required under the Water Industry Act 1991 to prepare a WRMP at least every five years and review it each year.

How we have taken Ofwat's feedback on board

Key points of feedback and referencing how we have taken on board:

1.1 Ambition – key feedback:

- Your presentation demonstrated a good understanding of how to set your ambition in line with our guidance.

Reference: Chapter 2: Our Ambition

1.2 Core and alternative pathways – Key feedback:

- Your presentation demonstrated a good understanding of how to develop the core pathway in line with our definition.
- Your presentation demonstrated a good understanding of how you are formulating alternative pathways in line with our guidance

Reference: Chapter 3: Strategy and Chapter 4: Rationale

We have shown how we have identified and developed the core and alternative pathways including identifying low/no regret investments that meets the criteria, trigger/decision points and how customers have informed our strategy and pace of investment. Our universal metering case study presented in Chapter4 is a good example of demonstrating our choice of adopting a no/low regret, flexible solution that keeps future options open as this minimises the cost of future options.

1.3 Scenario testing – Key feedback:

- You should test each of the common reference scenarios to inform your strategy.
- We expect you to use scenario testing to inform the development of your strategy
- You should note it is essential that only plausible scenarios are used to develop the core and alternative pathways – re wider scenario on affordability. Wider scenarios should be measurable factors with clear and observable metrics that can be used to define decision and trigger points.
- We saw only limited evidence that you are testing the common reference scenarios for technology in line with our guidance
- We would like to emphasise the importance of using the abstraction reduction scenarios to test the sensitivity of options to different futures, and to use this to refine the strategy

Reference: Chapter 3: Strategy and Chapter 4: Rationale – Common reference testing

We have tested our core pathway against all the individual common reference scenarios and have shown the impact it had and where it triggers alternative pathways and has how it had informed the development of our strategy to meet a range of plausible futures. We have also shown how we have considered the wider scenario testing withs regard to affordability.

1.4 Base Expenditure – Key feedback:

- You should We saw only limited evidence that you are considering long-term performance improvements from base expenditure

Reference: Chapter 2: Ambition – in developing our long-term performance commitment PC) targets to 2050 follows a section on "Balancing base and enhancement expenditure to deliver our long-term commitments" for each PC we have shown the assumption and links (where possible) to base and enhancement and the overarching assumption that a significant proportion of our long-term commitments will be delivered through base expenditure.

1.5 Engagement – Key feedback:

- We are encouraged to see that customer engagement is informing your ambition and the selection and sequencing of key investments
- We are pleased to see that you are engaging your Board and senior management in the development of your strategy

Reference: Chapter 1: Setting the context of our strategy – Customer and Stakeholder engagement

This section shows the extensive customer research undertaken and further triangulation to develop a decision framework to evidence how customers views have been reflected in our ambition and strategy.

Furthermore the board assurance sections - shows the multiple touch point and engagement we have had with our board including our independent non-executive partaking in in depth stakeholder interviews to shape our customer research programme and board deep dive into technical discussions around how we developed alternative pathways and evidenced trigger and decision points feeding into the process through the develop of our LTDS (see Chapter 6: Board assurance).

List of appendices

SSC04 Data tables (includes the relevant LS Tables)

SSC04g PR24 Data tables commentary – Long-term strategies

SSC32 Long-Term Delivery Strategy climate change impacts on raw water quality technical report

SSC33 Impact – SSC LTDS triangulation report

SSC34 Draft CAM WRMP

SSC35 Draft SSW WRMP

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